



P 38.12  
2.4  
PR #166  
C.2.

FEB 8 - 1965

Progress Report PR 166

1964

# Oil and Gas Developments in Pennsylvania in 1963

William S. Lytle  
Addison S. Cate  
William G. McGlade  
Walter R. Wagner

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF INTERNAL AFFAIRS

Genevieve Blatt, Secretary

BUREAU OF

DOCUMENTS SECTION TOPOGRAPHIC AND GEOLOGIC SURVEY

Arthur A. Socolow, State Geologist



Digitized by the Internet Archive  
in 2016 with funding from

This project is made possible by a grant from the Institute of Museum and Library Services as administered by the Pennsylvania Department of Education through the Office of Commonwealth Libraries

# Oil and Gas Developments in Pennsylvania in 1963

---

by William S. Lytle, Addison S. Cate,  
William G. McGlade, and Walter R. Wagner

Staff Geologists

Pa. Geological Survey

---

PENNSYLVANIA GEOLOGICAL SURVEY  
FOURTH SERIES  
HARRISBURG

**1964**

Copyrighted 1964  
by the  
Commonwealth of Pennsylvania

Quotations from this book may be published if credit is given to the  
Pennsylvania Geological Survey

ADDITIONAL COPIES  
OF THIS PUBLICATION MAY BE PURCHASED FROM THE  
DIVISION OF DOCUMENTS, BUREAU OF PUBLICATIONS,  
10TH AND MARKET STREETS  
HARRISBURG, PA. 17125

## CONTENTS

	Page
Abstract .....	1
Introduction .....	1
Acknowledgments .....	4
Shallow-sand exploration and development .....	4
Shallow-sand gas developments .....	5
Shallow-sand oil developments .....	9
Deep-sand exploration and development .....	13
Developments in the deep gas fields .....	16
Interesting new Oriskany Gas Fields .....	25
Outlook for 1964 in deep exploration .....	29
Articles on Pennsylvania geology, 1963 .....	29

## ILLUSTRATIONS

### FIGURES

	Page
Figure 1. Columnar sections showing oil and gas sands of western Pennsylvania .....	8
2. Important shallow sandstone oil activities of 1963 ...	10
3. Stratigraphy of Minard Run Oil Co. #1 well .....	14
4. Structure contour map of the Hadden and Crichton Pools, Indiana County .....	24
5. Cross section in the Crichton Pool, Indiana County ..	26
6. Structure contour map of the Kahl Pool, Westmoreland County .....	27
7. Cross section in the Kahl Pool, Westmoreland County	28
8. Oil and gas fields of Pennsylvania .....	22

## TABLES

		Page
Table 1.	Deep and shallow well completions summary, Pennsylvania, 1963 .....	3
2.	Production in Pennsylvania, 1963 .....	3
3.	Shallow-sand well completions in Pennsylvania, 1963 .....	6
4.	Shallow-sand wells deepened in Pennsylvania, 1963 ..	7
5.	Price per barrel of crude oil, 1963 .....	11
6.	Oil wells and crude oil production in Pennsylvania by counties, 1961 and 1962 .....	12
7.	Summary of deep well completions in Pennsylvania, 1963 .....	16
8.	Deep gas production in Pennsylvania, 1963 .....	32
9.	Summarized records of deep wells drilled in Pennsylvania in 1963 .....	35
10.	Deep well samples collected during 1963 .....	46

# **OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1963**

by William S. Lytle, Addison S. Cate,

William G. McGlade, and Walter R. Wagner

## **ABSTRACT**

Exploration in Pennsylvania during 1963 resulted in the discovery of three new gas fields, one new gas pool, and four successful deeper pools. Several old gas pools and fields were extended by development drilling. Development drilling saw its biggest year in the Youngsville-Sugar Grove Oil Field of Warren County where 132 oil wells were drilled during the year. The daily production from this field reached a high of 1,700 barrels of crude oil a day.

The greatest density of drilling for deep production was in northwestern Pennsylvania in Crawford and Erie Counties where operators continued development of the Medina (Lower Silurian) gas pools. The eight discoveries are: the Artemas Field, Bedford County; Mays Pool, Clarion County; Sabula Pool, Clearfield County; Fike Field, Fayette County; Crichton and Hadden Pools, Indiana County; Mt. Zion Field, Somerset County; and the Sloan Pool, Westmoreland County.

There were 700 new wells drilled and 26 wells deepened during 1963. Of the 700 new wells, 672 were in proven fields, and 28 were exploratory tests (all deep wells). Of the 672 proven field wells, 461 were drilled outside of underground gas storage and secondary-recovery projects, 205 wells in secondary-recovery projects, and six wells in gas storage. Of the 461 development wells outside secondary-recovery projects, 202 were gas wells, 198 oil wells, and 61 dry holes. The total footage drilled during the year was 1,727,051 feet.

Exploratory tests totaled 28, drilling a total of 166,388 feet of hole. Of the 28 exploratory tests, 8 were successful, and 20 were dry, giving a success ratio of 1 in 3.5.

Oil pipeline runs totaled 5,014,000 bbls. of crude oil which is less than the total production of 5,238,000 bbls. for 1962. Proved oil reserves as of December 31, 1963 were estimated at 91,734,000 bbls. Gas produced totaled 92,340,000 Mcf as compared with 87,308,000 Mcf in 1962. Gas reserves were estimated at 1,214,498,000 Mcf at the end of the year. The total reservoir capacity for the storage of natural gas in Pennsylvania is 512,100,000 Mcf.

Seismic crews logged 91 weeks during the year. This is an increase of about 10 percent over the seismic activity in 1962. No gravity work was done but geological field parties were very active.

## **INTRODUCTION**

Summarized in this publication are the 1963 oil and gas developments for the State. The deep well skeletal logs (those which reached rocks of Middle Devonian age or older) are shown in Table 9. For those deep wells drilled prior to 1950 the skeletal logs and other information on Pennsylvania's oil and gas activities are to be found in Bulletin M-31; similar information for the 1950 to 1954 period was published in Bulletin M-39, for the 1955 to 1959 period in Bulletin M-45, and for the years



1960, 1961, and 1962 in Progress Reports 158, 160, and 165, all of the Fourth Series of the Pennsylvania Bureau of Topographic and Geologic Survey. Oil and gas developments of the shallow sands (Upper Devonian or younger) are described in Bulletin M-45 and Progress Reports 135, 139, 143, 144, 147, 150, 151, 154, 155, 157, 158, 160, and 165 of the Survey.

The deep wells from which drill cuttings were collected during the year are listed in Table 10. The Survey's "Catalogue of Deep Well Samples" (I. C. No. 16), as well as the supplemental lists published in Progress Reports 157, 158, 160, 165 and on Table 10 of this publication, record the complete list of deep well samples on file with the Survey.

Seven percent more deep wells were drilled in Pennsylvania in 1963 than in 1962. Of the 109 deep wells (Middle Devonian or older) drilled during the year, 28 were wildcats. This is 8 less wildcats than were drilled in 1962. Crawford County in northwestern Pennsylvania had the greatest density of deep drilling with 24 completions during the year. Indiana County was second with 18 deep wells. The 109 wells consisted of 66 gas wells, 3 drilled for gas storage, 1 drilled for waste disposal, and 39 dry holes. One of the development gas wells was a shallow well which was drilled deeper. The total deep footage amounted to 631,838 feet. Rotary tools completed 90 deep wells during the year most of which were air rotary; 19 were completed with cable tools.

In the shallow-sand (Upper Devonian or younger) territory of western Pennsylvania, the drilling activity showed an increase of about 2 percent. Crude oil prices remained the same throughout the year. The price of a barrel of Bradford crude oil was \$4.63. There were 617 shallow-sand wells completed in 1963. The total shallow footage drilled, including 25 wells deepened was 1,095,213 feet.

A classification of the wells, exclusive of those drilled for gas storage and secondary-recovery purposes is given in Table 1, and oil and gas production is shown in Table 2.

The production during 1963 in the Commonwealth amounted to 5,014,000 bbls. of crude oil and 92,340,000 Mcf of gas. The proved recoverable reserves on December 31, 1963 were 91,734,000 bbls. of crude oil and 1,214,498,000 Mcf of gas. The total reservoir capacity for storage of natural gas in Pennsylvania is 512,100,000 Mcf of which 491,231,000 Mcf (the amount actually stored) is included in the reserve figure. The amount of distillate produced in 1963 was 69,000 bbls. The gas figures are those published by the American Gas Association.



TABLE 1. *Deep and shallow well completions  
Summary, Pennsylvania, 1963\**

<i>Completions</i>	<i>Oil</i>	<i>Gas</i>	<i>Dry</i>	<i>Total</i>	<i>Percent Successful</i>
Exploratory tests .....	0	8	20	28	29
Development wells* .....	198	202	61	461	87
Totals .....	198	210	81	489	83

\* Does not include wells drilled in connection with underground gas storage or secondary-recovery operations.

TABLE 2. *Production in Pennsylvania, 1963*

	<i>1962</i>	<i>1963</i>	<i>Cumulative total to 12/31/63</i>	<i>Reserves 12/31/63</i>
Oil (bbls.) .....	5,238,000	5,014,000	1,246,224,000	91,734,000.
Gas (MCF) .....	87,308,000	92,340,000	7,688,386,000	1,214,498,000

The Pennsylvania Game Commission leased 7,715 acres of State Game Lands in 1963 for the exploration of oil and gas. An additional 335 acres under lease were conveyed to the Commission with the purchase of new State Game Land acreage. The rental bid ranged from \$1.00 to \$5.00 per acre with royalties of \$0.04 per Mcf for gas. A bonus of \$29,489.55, which covered the first year's rental, was paid on 7,715 acres. Two wells were drilled on the State Game Lands during the year; both were gas wells. At the end of 1963 the Commission had leased land totaling 25,206 acres covered by 27 leases. On 12 of the leases there were 16 productive gas wells.

The Pennsylvania Department of Forests and Waters during 1963 offered for regular bid 3 tracts totalling 11,291 acres; all bids were accepted. There were two bonus bid leases which drew bids ranging from \$2.12 to \$3.56 per acre for the first year and required a royalty of \$0.04 per Mcf. \$34,547.00 was realized for the year. A total of 7 wells were drilled on Forests and Waters acreage during the year resulting in 5 gas producers and 2 dry holes. During 1963, 2 company seismic surveys were made on Forests and Waters land in 4 counties on 3 structures. The acquisition of Moraine State Park in Butler County has created the unusual situation of making the Department of Forests and Waters the operator of the Muddy Creek Oil Field. The field is about 75 years old

and has more than 250 wells of which 100 are producing. The Department will continue to operate the field until commencement of park construction. At that time the plugging and abandoning of the operating wells will begin.

The Pennsylvania Conservation Commission had its first hearing since the effective date (September 24, 1961) of the conservation law. The hearing was held on June 20, 1963 and a spacing order was issued for the Five Forks Field in Southampton, Monroe, and Mann Townships, Bedford County. A spacing order was also issued for the Artemas Field in Bedford County.

Seismic crews logged 91 weeks during the year. This is an increase of about 10 percent over the seismic activity in 1962. No gravity work was done but geological field parties were very active.

The alcohol-flood experiment on leases owned by the Pennzoil Company in the Bradford Oil Field is still continuing. Isopropylalcohol was injected into the Bradford Third Sand and followed by water. The produced water has shown an increase in alcohol content and certain wells have had slight increases in the production of oil. It is hoped that some experimental conclusions can be arrived at during the year.

The thermal experiment in the Second Venango Sand in the Franklin area was carried out in 1963 by Quaker State Oil Refining Corporation. The collected data is being evaluated.

1963 was the first big year for shallow-sand reservoir stimulation by hydraulic fracturing in the State. The Youngsville Area in Warren County was very active and the Warren and Townville areas, although less active, had their share of success.

## **ACKNOWLEDGMENTS**

The writers acknowledge the cooperation, in the preparation of this review, of Donald O. Kauss, the Bradford District Producers Association, and the Northeastern Gas and Oil Scouts. Virginia Fairall and Albert Van-Olden of the Pennsylvania Bureau of Topographic and Geologic Survey did the drafting. Virginia Fairall and Eileen McClure, also of the Survey staff, assisted with the compiling of the data.

## **SHALLOW-SAND EXPLORATION AND DEVELOPMENT**

During 1963, there were 617 shallow-sand (Upper Devonian or younger) wells drilled in Pennsylvania. These wells are categorized as follows: 144 gas wells, 198 oil wells, 42 dry holes, 3 gas storage wells, 25 wells drilled deeper (gas, oil or dry hole), and 205 wells drilled in

connection with secondary-recovery operations. The total footage drilled in all of these wells was 1,095,213 feet. Although the total wells drilled this year is only 15 over the 602 drilled in 1962, it is important to note that the emphasis on drilling is beginning to shift from secondary recovery to primary oil well drilling. Table 3 shows the shallow-sand well completions in Pennsylvania exclusive of those drilled in secondary-recovery oil operations or underground gas storage. Table 4 indicates the results of deepening 25 shallow-sand wells in 1963. The stratigraphic positions of the various shallow oil and gas-producing sands in Western Pennsylvania are shown in three columnar sections on Figure 1.

In 1963, there were 198 new oil wells completed in Pennsylvania, exclusive of the wells drilled in secondary recovery oil operations. These 198 oil completions show significant increases over the 97 new oil wells drilled in 1962 and the 43 drilled in 1961. This spectacular resurgence in development and step-out oil well drilling in Pennsylvania is mainly attributed to the successful results of new and improved completion techniques such as notching and hydrofracturing.

Of the 144 new gas wells drilled, gauges of 141 wells showed a combined total initial open-flow capacity of 71,740 MCFPD compared with the 65,525 MCFPD from the 137 gas wells completed in 1962. In those wells where reservoir stimulation was used, the open flow gauges obtained after stimulation were used in computing the totals.

During completion, reservoir stimulation was applied to 122 of the 144 new gas wells and yielded a total initial open-flow capacity of 69,681 MCFPD. Of the 122 stimulated gas wells, statistics show that the total initial open-flow capacity of 26 wells before stimulation was 1,366 MCFPD. This rate of production in the 26 wells was increased to 20,803 MCFPD by reservoir stimulation. Of the 22 gas wells completed by drilling deeper, 18 were stimulated. The total initial open-flow capacity of these stimulated wells was 9,092 MCFPD. A comparison of before-and-after-stimulation production rates shows that the total initial open-flow capacity of 10 wells was 1,099 MCFPD as compared with 6,749 MCFPD.

## SHALLOW-SAND GAS DEVELOPMENTS

The majority of wells drilled for shallow-sand gas were scheduled to Speechley, Balltown, and Bradford objectives during 1963.

Indiana County dominated the shallow gas activity this year as it did in 1962. Fifty-eight (58) new gas wells were completed in this county, of which 55 were stimulated at completion. These wells gauged a combined, total initial open-flow capacity of 38,797 MCFPD. The total open-flow capacity of 11 of these wells was 908 MCFPD before fracturing as

TABLE 3. Shallow-sand well completions in Pennsylvania, 1963\*

TOTAL			GAS			OIL			DRY		
No. of Wells	Aver. Total Depth (Feet)	No. of Wells	Aver. Init. Open-Flow (MCFPD)	Aver. Total Depth (Feet)	No. of Wells	Aver. Init. Prod. (BOPD)	Aver. Total Depth (Feet)	No. of Wells	Aver. Total Depth (Feet)	No. of Wells	Aver. Total Depth
Allegheny .....	1	3,066	1	878	3,066	..	..	..	..	..	..
Armstrong .....	29	2,993	27	548	3,042	1	1,610	1	3,056	1	3,056
Butler .....	10	1,792	1	45	2,660	7	13½	2	2,834	2	2,834
Clarion .....	20	2,396	14	483	2,519	4	3	2	2,289	2	2,289
Clearfield .....	2	3,158	1	1,243	3,116	..	..	1	3,200	1	3,200
Crawford .....	2	764	..	..	..	2	1	..	..	..	..
Elk .....	5	2,409	1	10	2,372	3	1½	1	2,334	1	2,334
Fayette .....	4	1,400	2	228	1,429	..	..	2	1,371	2	1,371
Forest .....	7	1,645	2	18	2,490	2	10	3	983	3	983
Greene .....	2	776	..	..	..	1	1½	1	640	1	640
Indiana .....	62	3,456	58	675	3,453	..	..	4	3,504	4	3,504
Jefferson .....	6	2,887	6	525	2,887	..	..	..	..	..	..
McKean .....	11	1,761	6	56	2,169	5	7½	..	..	..	..
Mercer .....	2	965	1	..	851	..	..	1	1,079	1	1,079
Potter .....	3	1,340	..	..	..	3	1	..	..	..	..
Venango .....	28	1,096	3	3	1,089	19	40	6	1,510	6	1,510
Warren .....	162	849	3	325	836	151	69	8	1,084	8	1,084
Washington ...	3	2,909	..	..	..	..	..	3	2,909	3	2,909
Westmoreland .	25	3,099	18	266	2,868	..	..	7	3,694	7	3,694
Total .....	384	1,836	144	509	2,954	198	61	42	2,193	42	2,193

\* Does not include wells drilled in connection with underground gas storage or secondary-recovery oil operations.

TABLE 4. Shallow-sand wells deepened in Pennsylvania, 1963\*

	TOTAL			GAS			OIL			DRY		
	No. of Wells	Aver. Amt. Deepened (Feet)	No. of Wells	Aver. Init. Open-Flow (MCFPD)	Aver. Amt. Deepened (Feet)	No. of Wells	Aver. Init. Prod. (BOPD)	Aver. Amt. Deepened (Feet)	No. of Wells	Aver. Amt. Deepened (Feet)	No. of Wells	Aver. Amt. Deepened (Feet)
Allegheny .....	1	735	1	578	735	..	..	..	..	..	..	..
Armstrong ....	11	907	10	302	918	..	..	..	1	..	1	789
Clarion .....	2	1,463	2	609	1,463	..	..	..	..	..	..	..
Forest .....	1	254	..	..	..	1	75	254	..	..	..	..
Greene .....	2	203	2	121	203	..	..	..	..	..	..	..
Indiana .....	6	1,538	6	639	1,538	..	..	..	..	..	..	..
Potter .....	1	163	..	..	..	1	..	163	..	..	..	..
Washington ...	1	220	1	..	220	..	..	..	..	..	..	..
Total .....	25	956	22	423	1,032	2	75	208	1	..	1	789

\* Does not include wells drilled in connection with underground gas storage or secondary-recovery oil operations.



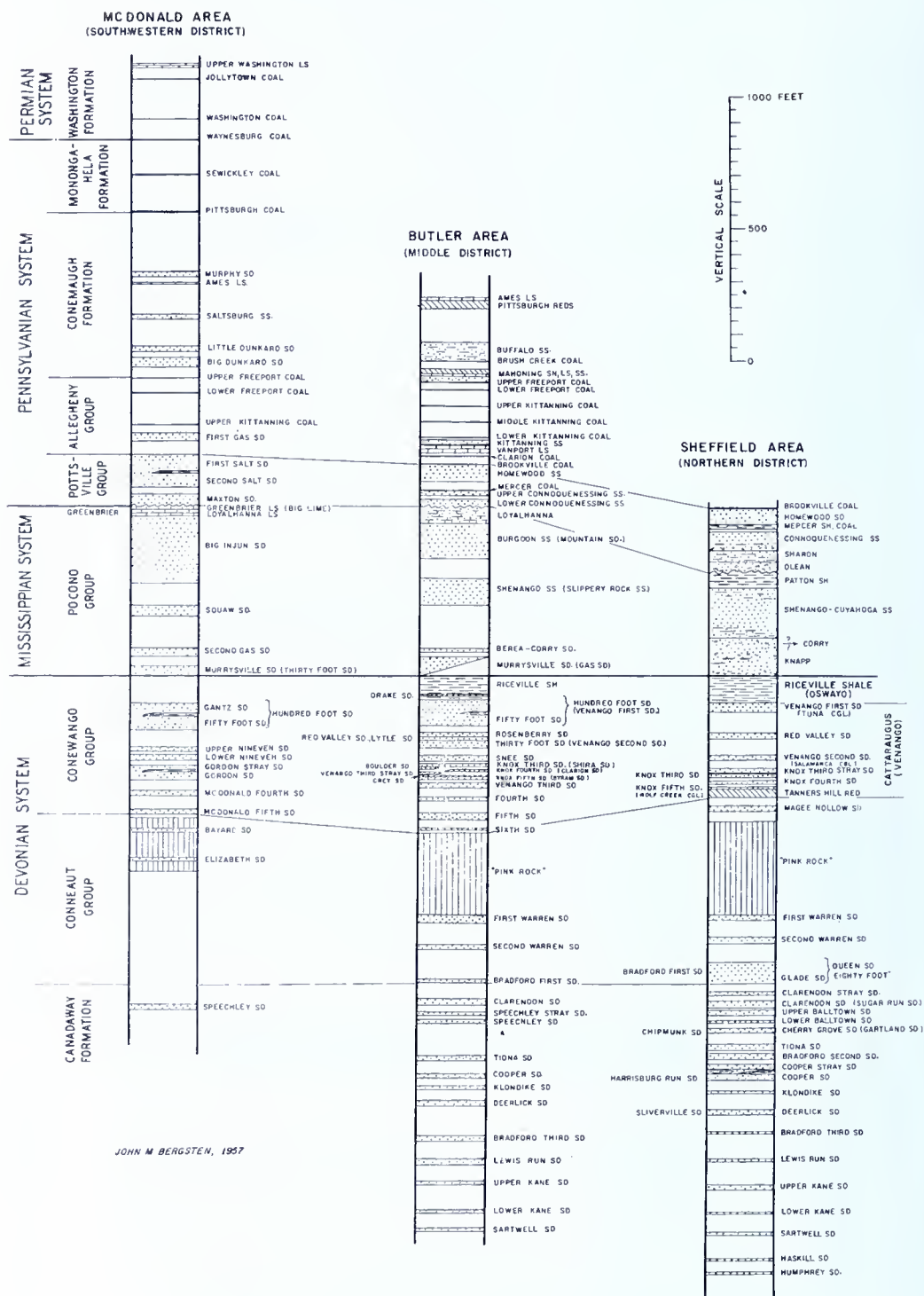


Figure 1. Columnar sections showing oil and gas sands of western Pennsylvania.

compared with 11,054 MCFPD after fracturing. During 1963, 27 new gas wells were drilled in Armstrong County, 18 in Westmoreland County and 14 in Clarion County. Three new shallow gas storage wells were reported this year. They were drilled in the Donegal gas storage field in Washington County. No new shallow-sand gas fields or pools were discovered during 1963 in Pennsylvania.

## SHALLOW-SAND OIL DEVELOPMENTS

During 1963, there were 198 new oil wells completed in Pennsylvania. These oil wells, representing an increase of 101 wells over 1962, were drilled in 11 counties of the State. Figure 2 is a map of western Pennsylvania showing the greater portion of the shallow oil fields of this region. The important areas of shallow oil activities of 1963 are outlined on this map and are described briefly below:

### (1) Townville quadrangle (Venango County):

Successful oil completions, using reservoir stimulation, have been made in the Venango sands of Jackson, Plum, and Oakland Townships of Venango County. Response to hydrofracturing has been successful; however, details are few at this early date in the development of this area. Drilling activity and oil and gas leasing increased steadily in this portion of Venango County during the past year.

### (2) Youngsville quadrangle (Warren County):

One hundred and thirty-two (132) of the total 198 new oil wells were drilled in the Sugar Grove, Chandlers Valley, Mathews Run and Youngsville areas located in the Youngsville quadrangle of western Warren County. The producing horizon here is the Glade sandstone. This reservoir has continued to respond very well to the new and improved completion methods involving notching and hydrofracturing. Initial potentials of close to 400 BOPD (barrels of oil per day) have been reported. Although most of the wells in this area have been field developments wells, a few extension and wildcat wells have been drilled west, south and east of the proven areas. This area will be described in detail in a forthcoming geological study of the Youngsville quadrangle by the Pennsylvania Geological Survey.

### (3) Warren quadrangle (Warren County):

The Glade and Clarendon sandstones were the targets in this section of Warren County adjacent to the city of Warren. Nineteen (19) oil wells were completed during 1963 from the Glade and Clarendon horizons. Reservoir stimulation similar to that employed in the Youngsville quadrangle has been used here successfully.

### (4) Pilot Project-Secondary Oil Recovery—Foxburg quadrangle (Butler County):

J. G. Dyer and the Consolidated Royalty Oil Company have been conducting a pilot water-injection project in the Knox sands of northeastern Butler County. This test is situated in an area of old Knox sand(s) production in Parker Township known as the Bear Creek Field. This is the first extensive water injection project in the Foxburg-Clarion area. Thus far, nine wells have been drilled; however, since operating details are still incomplete, only 5 of these wells are reported in the 1963 footage statistics. It is anticipated by the operators that this project will be put on flood during 1964.



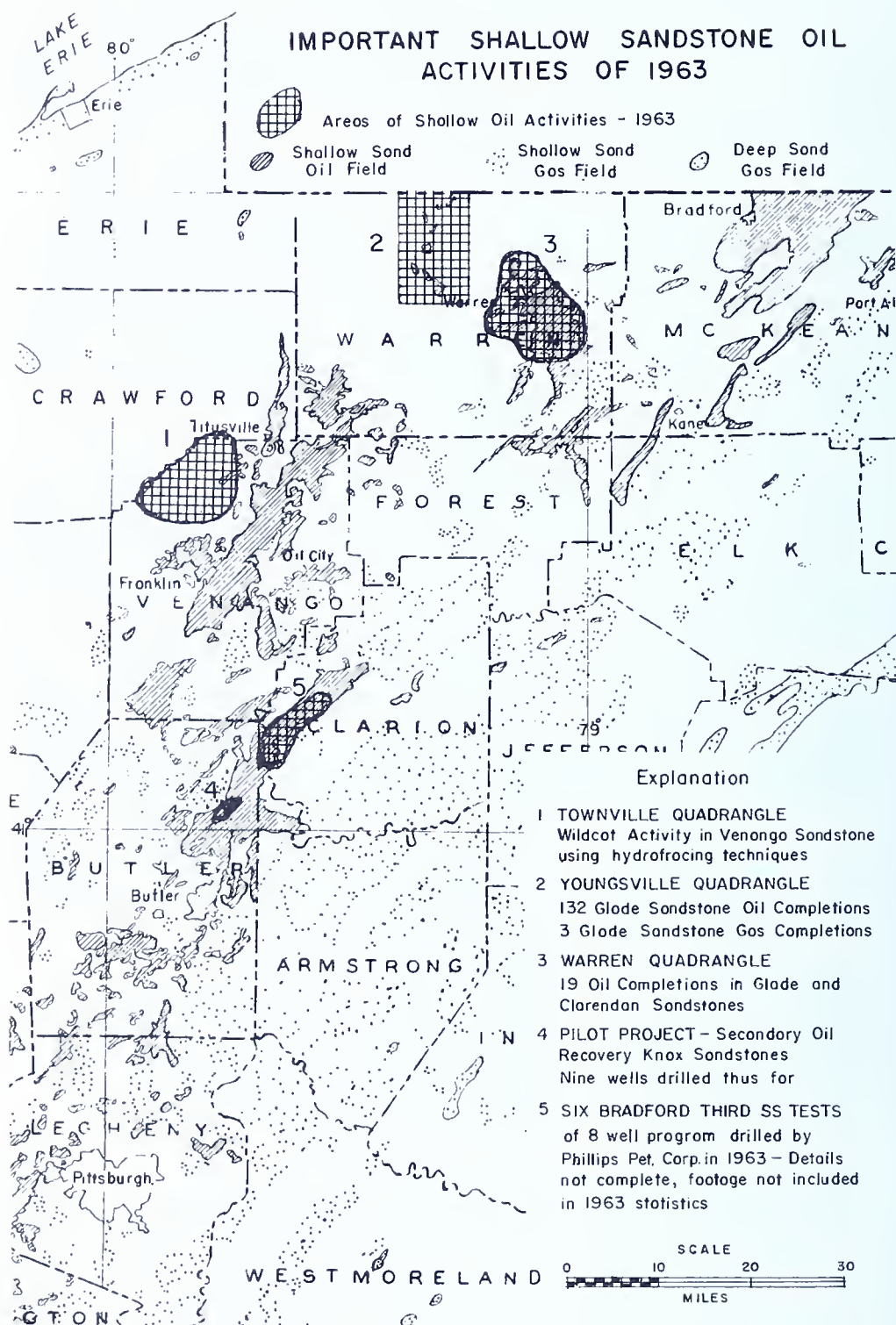


Figure 2. Important shallow sandstone oil activities of 1963.

(5) **Eight-Well Drilling Program—Foxburg quadrangle (Clarion County):**

The Phillips Petroleum Company, Bartlesville, Oklahoma, has drilled 6 Bradford Third sand tests in northwestern Clarion County thus far as part of an 8-well drilling program in this area. Details are still incomplete and since the disposition of the wells is not known as of this date, the footages of these wells are not included in the 1963 statistics. At this writing, the seventh well is being drilled. This exploratory program is being conducted within a belt of old Knox Third sand and Knox Fourth sand production. Phillips is reportedly testing these wells exhaustively with the most modern stimulation techniques.

The State's oil production averaged 13,737 BOPD as compared with 14,351 BOPD for 1962. Crude oil prices remained the same for the entire year. Table 5 shows the price of crude oil during the year in the 3 marketing districts in Pennsylvania.

TABLE 5. *Price per barrel of crude oil, 1963*

<i>Date</i>	<i>Northern or Bradford District</i>	<i>Middle or Venango District</i>	<i>Southwestern District</i>
Jan. 1, 1963	\$4.63	\$4.35	\$4.08
Dec. 31, 1963	\$4.63	\$4.35	\$4.08

Statistics for the Bradford Field, which includes the Bradford, Guffy, and Burning Well Pools, show that 243 new wells were drilled in 1963 in connection with secondary-recovery oil operations, as compared with 405 wells drilled in 1962, a decrease of 40 percent. Of these wells, 43 were fractured. The daily average production for the field decreased from 12,216 BOPD in 1962 to 11,304 BOPD in 1963. In the Pennsylvania part of the field (14 percent of the field acreage is in New York State) 191 wells were completed and 40 wells were fractured. Production amounted to 9,100 BOPD, an amount which represents about 66 percent of the total production of the State in 1963.

The average daily oil production of the Middle and Southwestern Districts of Pennsylvania was 4,637 bbls. in 1963 as compared with 3,888 bbls. in 1962, an increase of about 19 percent. The increase is due to the rapid development in the Youngsville-Sugar Grove Field and its excellent response to stimulation by hydrofracturing.

Table 6 shows the number of oil wells and the crude oil production by counties in Pennsylvania for the years 1961 and 1962.

During 1963 new interest was generated in the shallow sands of Pennsylvania by the continued high success ratios of wells drilled in oil reservoirs such as the Venango sands, and the Glade and Clarendon sandstones. Completion techniques are the vital ingredients of this success,

TABLE 6. *Oil wells and crude oil production in Pennsylvania by counties, 1961 and 1962\**

<i>County</i>	<i>1961</i>		<i>1962</i>	
	<i>Number of producing oil wells</i>	<i>Crude oil production (bbls.)</i>	<i>Number of producing oil wells</i>	<i>Crude oil production (bbls.)</i>
Allegheny .....	403	123,540	394	123,024
Armstrong .....	167	12,552	161	10,355
Beaver .....	140	10,278	131	8,058
Butler .....	2,466	158,728	2,439	150,025
Clarion .....	928	43,884	878	52,536
Crawford .....	502	28,496	497	24,610
Elk .....	646	23,540	645	34,105
Fayette .....	5	496	4	201
Forest .....	1,036	44,794	1,026	58,943
Greene .....	309	59,050	305	57,091
Jefferson .....	91	3,609	87	3,444
McKean .....	25,648	4,217,625	23,403	3,843,455
Mercer .....	227	3,422	227	3,153
Potter .....	418	57,438	418	50,731
Tioga .....	16	854	16	878
Venango .....	17,086	352,050	15,677	319,780
Warren .....	8,299	219,324	8,286	217,738
Washington .....	837	171,271	835	161,505
Total .....	59,224	5,530,951	55,429	5,119,632

\* *Data from Bureau of Statistics, Department of Internal Affairs, Harrisburg, Pennsylvania*

but renewed attention must also be given to the very important task of developing new and detailed subsurface geological studies of these Upper Devonian rocks. It is anticipated that the ratio of wildcat and step-out wells to development wells will increase in 1964 as the search in undrilled areas for these potentially productive rocks expands.

The pilot water injection flood in northeastern Butler County commands attention during 1964 since it is the intention of the operators to commence flooding during this coming year. It may well set the pattern for future secondary recovery projects in the "Middle Oil District" of Pennsylvania.

## DEEP-SAND EXPLORATION AND DEVELOPMENT

1963 deep-sand exploration in Pennsylvania resulted in the discovery of 3 new gas fields, 1 new gas pool, and 4 successful deeper pools. Several old gas pools and fields were extended by development drilling. The greatest density of drilling for deep production was in northwestern Pennsylvania in Crawford and Erie Counties where operators continued development of the Medina gas pools. The number of wildcats drilled during the year amounted to 28 which is 8 less than the number drilled in 1962. The State's producing depth record of 8,574 feet (in Oriskany) is still held by Felmont's No. 1 Snyder in Somerset County. The drilling depth record is still held by Pure Oil Company's Charles Blemle No. 1 in Bradford County. The well reached a total depth of 12,843 feet in the Tuscarora (Lower Silurian).

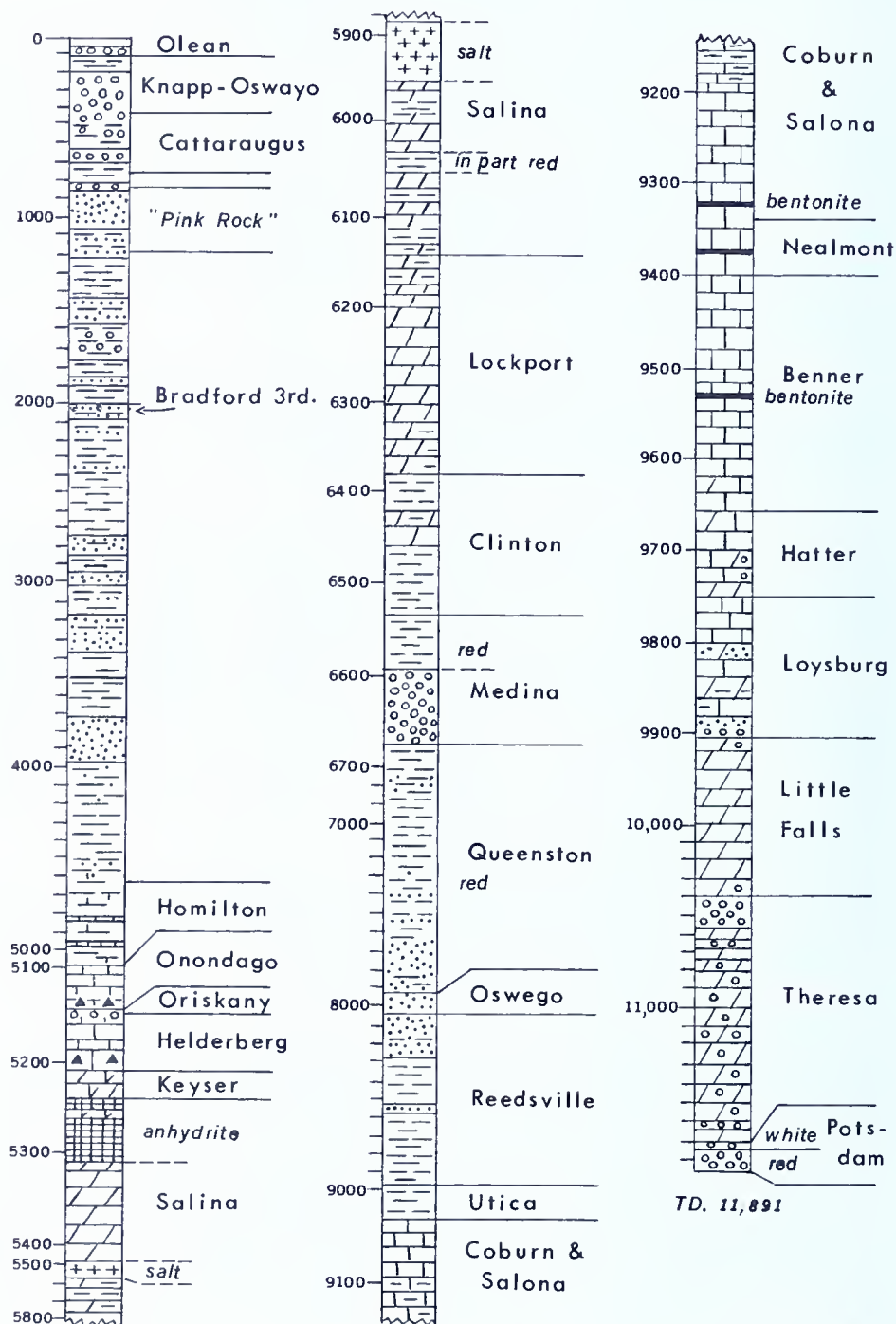
Table 9 summarizes the skeletal logs of the deep wells completed during the year, and the well locations are shown on Figure 8. Figure 3 shows the stratigraphy of the Minard Run Oil Company No. 1 well drilled in Bradford Township, McKean County in 1962.

*Stratigraphic notes on the Minard Run No. 1, McKean Co.*:—The Minard Run well, drilled by the Minard Run Oil Co., is one of the deepest wells in the State both in depth and stratigraphic position. The well started in Pennsylvanian sandstone and finished at 11,891 feet probably not far above basement in arkosic sandstone of Late Cambrian age. The following short notes partially explain the reasons for picking some of the contacts:

1. The Pennsylvanian-Mississippian boundary is placed at the unconformity at the base of the Olean Formation.
2. The Knapp and Oswayo Formations are grouped because of difficulty distinguishing between them. A Mississippian age is traditionally assigned to the Knapp and a Devonian age to the Oswayo.
3. The top of the Hamilton is placed at 4640 at the base of the black shale; no Tully limestone is present.
4. Because of considerable amounts of dark shale reported between 5050 and 5110 the top of the Onondaga is estimated midway in the interval at 5080.
5. The very fine-textured to microcrystalline dolomite and dolomitic limestone between the Helderberg limestones and the anhydrite of the Salina Group is called Keyser instead of Bass Island. The Bass Island crystalline dolomites lie in the same stratigraphic position but are located farther to the west. The Devonian-Silurian boundary is probably within the Keyser.
6. The red and green shale from 6030 to 6049 may be a tongue of the Vernon Formation of the Salina Group.

## MINARD RUN OIL COMPANY No. 1

Bradford Twp., McKean Co., Pa.



W. R. W. 2-64

Figure 3. Stratigraphy of Minard Run Oil Co. no. 1 well.



7. Below the red shale, the interval from 6049 to 6140 is interbedded shale and very fine textured to microcrystalline dolomite which has been placed in the basal Salina. These strata plus the upper 30 feet (6140-6170) assigned to the Lockport may be the equivalent of the McKenzie Formation in central Pennsylvania.
8. The Oswego Formation is represented by greenish siltstone lying between red-beds of the Queenston and gray shales and siltstones of the Reedsville.
9. The very fine-to-medium-textured limestones from 9030 to 9400 are divided into the Coburn, Salona, and Nealmont Formations of the Trenton Group. The microcrystalline limestones from 9400 to 9750 are split into the Benner and Hatter Formations of the Black River(?) Group and the Chazy limestones and dolomites (9750-9905) are called the Loysburg Formation. All these formational names come from central Pennsylvania and are favored over New York names because their boundaries are less dependent upon faunal criteria than comparable New York terms.
10. No Beekmantown strata are present.
11. The Upper Cambrian terminology of New York is used in place of the Gatesburg of Pennsylvania because the five-fold subdivision of the Gatesburg is difficult to recognize.

By the end of 1963 a total of 2,413 deep wells had been drilled in the State. Of the 2,413 deep wells drilled to date, 1,375 were gas wells, 6 were oil and gas wells, 955 were dry holes, 75 were drilled for gas storage, and 2 were to be used for the disposal of waste.

During the year 106 wells were drilled to the Oriskany Formation or deeper, of which 34 were Oriskany gas wells, 32 were Medina gas wells, 37 had shows of gas or were dry holes, 2 were drilled for gas storage, and 1 was drilled for waste disposal. Three wells did not reach the Onondaga (Middle Devonian); one of these was drilled for gas storage. They all were dry. Of the 109 deep wells completed during the year, 80 were fractured, and 61 of these were completed as gas wells. Before fracturing the total open-flow capacities of 28 wells, for which fracturing data were obtained amounted to 15,331 MCFGPD, compared with 84,795 MCFGPD after fracturing. Six gas wells were not fractured, and their total initial open-flow capacities amounted to 74,669 MCFGPD. The deep well footage amounted to 631,838 feet. Rotary tools completed 90 deep wells during the year, mostly with air rotary, and 19 were completed with cable tools.

The Kastle Pool in Crawford County and the Crichton Pool in Indiana County both had 11 gas wells and 4 dry holes drilled within or in definition of their boundaries during the year. The Indian Spring Pool in Crawford County was next with 8 gas wells and the Kahl Pool in Westmoreland County had 7 gas wells. The deep well completions for Pennsylvania during 1963 are summarized in Table 7. Table 8 shows the 1963 gas production from the State's deep gas reservoirs.

TABLE 7. *Summary of deep-well completions in Pennsylvania, 1963*

	<i>Development</i>		<i>Wildcat</i>		<i>Storage</i>	<i>Disposal</i>	<i>Total</i>
Gas	58		8		2		68
Dry		19		20	1	1	41
Footage	305,726	143,695	48,948	117,440	13,727	2,302	631,838

## DEVELOPMENT IN THE DEEP GAS FIELDS

Erie County had 16 completions during the year—all gas production developed in 1963 was from the Medina (Lower Silurian) sands. The Bushnell-Lexington Pool had 11 successful gas completions, one of which was an outpost, and 2 unsuccessful outposts. The successful outpost was the B. Blood No. 1 well (No. 50, Fig. 8, and Table 9) by Paul Britton et al in Conneaut Township which extended the pool to the northwest. After finding the Medina (Lower Silurian) at 3,016 feet, the well reached total depth at 3,144 feet and the Medina was hydrofractured. The initial open-flow amounted to 633 MCFGPD at a 5-day rock pressure of 1,004 psi (pounds per square inch). The largest initial open-flow of the wells drilled in this field during the year was recorded by the A. Richards No. 1 well (No. 60, Fig. 8 and Table 9) by Grantley Co. in Conneaut Township. The Medina which was found at 3,182 feet produced 15,000 MCFGPD after fracturing. The two unsuccessful outposts (Nos. 53 and 56, Fig. 8, and Table 9) helped define the limits of the pool along its southeastern edge. The Lundys Lane Pool in the same county had two successful development wells. One was an outpost, the J. Gage No. 1 (No. 55, Fig. 8, and Table 9) by Newmac Oil in Conneaut Township. Gas was found in the Medina extending the pool limits 1-1/2 miles to the northwest. A well (No. 48, Fig. 8, and Table 9) was drilled to the Lockport (Middle Silurian) in the City of Erie by the Hammermill Paper Co. for a waste disposal well. The Lockport was found at 2,056 feet and the well reached total depth at 2,302 feet still in the Lockport. Strata in which disposal is being contemplated are the Bass Island and Lockport Formations.

Crawford County with 24 completions had 8 successful gas wells in the Indian Spring Pool (including one successful extension), 11 successful gas wells and 4 dry holes in the Kastle Pool and an unsuccessful new pool wildcat. As in Erie County all gas production developed in 1963 was from the Medina section. The successful extension in the Indian Spring Pool was a deeper pool test. It was drilled by Ventura Oil and



Transamerican Petroleum on the Reynolds (No. 32, Fig. 8, and Table 9) in Summerhill Township. After finding saltwater in the Gatesburg (Upper Cambrian) at 6,620 feet the well was plugged back to the Medina and completed as an Indian Spring Pool extension. It extended the pool about 1 mile to the south. The open-flow amounted to 248 MCFGPD at a 7-day rock pressure of 1200 psi. A wildcat by Transamerican Petroleum on the Voorhees (No. 29, Fig. 8, and Table 9) in Beaver Township was drilled 3 miles south of the Bushnell-Lexington Pool. After drilling to the Queenston (Upper Ordovician) and encountering only saltwater the well was temporarily abandoned. Three of the dry holes in the Kastle Pool area were outpost wells. The J. L. Morris No. 1 (No. 30, Fig. 8, and Table 9) was drilled by Transamerican Petroleum about 2 miles west of the pool in Summerhill Township; a show of gas was found in the Medina but after drilling to the Queenston the well was abandoned at a total depth of 4,228 feet. A second Kastle Pool area dry hole, the McKim-Gaut No. 1 (No. 41, Fig. 8, Table 9) by Transamerican Petroleum, was drilled 3 miles south of the pool and was abandoned at a total depth of 4,235 feet after reaching the Queenston. All of the 11 gas wells are shut in and the operator (Transamerican Petroleum) is awaiting a transportation line. The well with the highest initial open-flow in the pool was the N. Van Buren No. 1 (No. 33, Fig. 8, and Table 9) in Hayfield Township. Gas was from the Medina and the Queenston was found at 4,200 feet. After fracturing, the initial open-flow was 4,100 MCFGPD at a rock pressure of 1,210 psi in 24 hrs.

In McKean County a well was drilled on the Bradford Watershed property by George Kroh in Foster Township (No. 87, Fig. 8, and Table 9). After finding the Oriskany at 4,670 feet containing saltwater the well was abandoned at 4,683 feet. This well was an outpost to the Mallory Pool.

Potter County had one wildcat drilled during the year. The No. 1 well on Pa. Warrant 4763 was drilled by Fairman Drilling Co. in Wharton Township (No. 92, Fig. 8, and Table 9) on the southeast flank of the Sabinsville anticline. The operator was looking for a stratigraphic trap in the Oriskany such as occurs farther to the southwest on the flank of this same anticline. The Oriskany was found at 7,059 feet but it was dry and the well was abandoned at a total depth of 7,081 feet.

Tioga County had 3 gas storage wells drilled in the Sabinsville Storage Field. Two of the wells found the storage horizon but the J. L. Trimmer No. 2 (No. 94, Fig. 8, and Table 9) by New York State Natural Gas Corp. in Clymer Township found a faulted zone and did not find the Oriskany. The well was abandoned at a total depth of 4,663 feet.

Bradford County had two wildcats drilled on the Towanda anticline. The Headlee No. 1 (No. 14, Fig. 8, and Table 9) was drilled by Obie Shaw in West Burlington Township and then abandoned; the Oriskany was at 4,013 feet and contained saltwater. The second well, H. W. Lundy No. 1 (No. 15, Fig. 8, and Table 9), was drilled by Fairman Drilling Co., Mobil Oil Co., and Shell Oil Co. in Standing Stone Township. The Oriskany was found dry at 6,468 feet and the well was abandoned at a total depth of 6,610 feet.

Mercer County had 3 wildcats drilled within its borders. Two of the wildcats were drilled to the Queenston and encountered slightly larger than normal shows of gas and saltwater in the Lockport. Both wells were subsequently abandoned (see Nos. 88 and 89, Fig. 8, and Table 9). The third wildcat also drilled to the Queenston, was the Cromarti No. 1A (No. 90, Fig. 8, and Table 9) and was drilled by Vandenberg et al in Hickory Township; after fracturing the Medina, the initial open-flow amounted to 300 MCFGPD at a 7-day rock pressure of 1,455 psi. The well is shut in at this time and has not produced.

Clarion County had one deeper pool test during the year—the J. A. Mays No. 1 (No. 18, Fig. 8, and Table 9), drilled by Paul Schaffer et al in Clarion Township. This well is located in the center of a large area where it was thought the Oriskany Sandstone was probably absent (see Fig. 8). About 37 wells had been drilled in this large area and none of them had found the Oriskany present. It was thought either that this area must have been a generally positive area during Oriskany deposition or that the Oriskany had been deposited and then eroded at a later time. The Mays well found 13 feet of the Oriskany Sandstone which contained gas and saltwater. The well was drilled through the Medina and about 10 MCFGPD was found in the Medina, but fracturing did not increase the flow. The top of the Red Medina was logged at 7,598 feet. The well was plugged back to 6,000 feet, the Oriskany was from 5,832 to 5,845 feet and after fracturing the initial open-flow was 400 MCFGPD with some saltwater and rock pressure of 2,500 psi. This well is considered to have discovered the Mays Pool in the Clarion Field. This discovery will probably stimulate wildcatting in this large area where heretofore it had been thought the Oriskany was probably absent.

Jefferson County had one deeper pool test in 1963. The Pa. Game Lands Tract 195A, No. 1 by New York State Natural Gas Corp. (No. 86, Fig. 8, and Table 9) was in Gaskill Township on the northwest flank of Chestnut Ridge anticline. After finding the Oriskany dry from 7,293 feet to 7,309 feet the well was plugged back to 3,225 feet and fractured in a shallow Upper Devonian sandstone. After fracturing, the well made 1,719 MCFGPD at a 20-day rock pressure of 1,230 psi. The well is located in Bell Field.

Clearfield County saw 2 wildcats and one field well drilled during the year. The field well was a dry hole in the Rockton Pool. In Bigler Township on the southeast flank of the Laurel Hill anticline, New York State Natural Gas Corp. drilled one of the wildcats, the P. Swistock No. 1 (No. 20, Fig. 8, and Table 9). The Oriskany was found dry between 7,995 feet and 8,010 feet and the well was abandoned at a total depth of 8,035 feet. A second wildcat, Green Glen Corp. No. 4 (No. 21, Fig. 8, and Table 9) also drilled by New York State Natural Gas Corp. et al was located in Sandy Township. This well was drilled on a fault block, just south of the Boone Mt. Pool (on the southeast flank of the Sabinsville anticline). After fracturing, the well produced 9,191 MCFGPD at a 20-day rock pressure of 3,813 psi from the Oriskany interval 7,411 feet to 7,439 feet, discovering the Sabula Pool.

Elk County had a Boone Mt. Pool outpost drilled about 5 miles northeast of the pool. A. J. Palumbo No. 13 (No. 47, Fig. 8, and Table 9) by New York State Natural Gas Corp. was drilled in Jay Township. The Oriskany was found dry from 7,042 to 7,068 feet and the well was abandoned.

Cameron County had an unsuccessful Hicks Run outpost. The A. Pardee Est. No. 11 (No. 17, Fig. 8, and Table 9) by New York State Natural Gas Corp. was drilled in Lumber Township as a two-mile outpost. Saltwater was found in the Oriskany at 6,575 feet and the well was abandoned at a total depth of 6,625 feet.

Clinton County on Pa. Tract 102 had a well drilled by Phillips Petroleum Co. in Beech Creek Township (No. 22, Fig. 8, and Table 9). The wildcat was drilled on the Ferney anticline. The Oriskany was found at 8,414 feet and the well reached total depth at 8,469 feet. After fracturing the well produced 67 MCFGPD and was abandoned.

Northumberland County on the Kishacoquillas anticline had one new field wildcat drilled during the year. The Epler No. 1 (No. 91, Fig. 8, and Table 9) by Matthews et al in Point Township reached the Bloomsburg (Middle Silurian) and was abandoned at a total depth of 4,888 feet.

Armstrong County had an unsuccessful deeper pool test during the year. The W. B. Porter No. 2 (No. 1, Fig. 8, and Table 9) by New York State Natural Gas Corp. in South Bend Township had saltwater in the Oriskany which was found at 7,707 feet. After reaching a total depth of 7,751 feet the well was plugged back to 3,225 feet. The attempt to complete the well as a shallow storage well failed and it was abandoned.

Indiana County with 18 completions had 11 successful gas wells, one of which was a successful deeper pool test, and 4 dry holes—all in or about the Crichton Pool; 1 gas well in the Hadden Pool; 1 dry outpost in the



Rockton Pool; and a dry wildcat. The A. B. Crichton No. 1 well (No. 71, Fig. 8, and Table 9) by Manufacturers Light and Heat Co. in Brush Valley Township discovered the Crichton Pool when gas was found in the Oriskany at 7,684 feet. After fracturing the well produced 7,710 MCFGPD at a 72-hour rock pressure of 4,033 psi. The pool is located in the Cherry Hill Field on the Chestnut Ridge anticline. The 4 dry holes drilled in the pool limit the pool on the western and eastern edges. North of the Crichton Pool and on the opposite flank of the anticline from the Crichton Pool, the Annie Hadden No. 1 (No. 75, Fig. 8, and Table 9) by Fairman Drilling Co. in Cherryhill Township discovered the one-well Hadden Pool when gas was found at 7,932 feet in the Oriskany. The H. C. Bonner No. 1 (No. 84, Fig. 8, and Table 9) by New York State Natural Gas Corp. was drilled as a 1 mile outpost to the Rockton Pool. The well found a show of gas and saltwater in the Oriskany from 7,565 to 7,572 feet and was abandoned. An unsuccessful deeper pool test was drilled by New York State Natural Gas Corp. on the J. M. Richardson lease in Canoe Township. The Oriskany was found at 7,423 feet to 7,442 feet and contained a show of gas and some saltwater. The well was plugged back to 3,150 feet and completed as a gas well in the Upper Devonian Bradford sand in the Richmond (shallow gas) Field.

Cambria County had one wildcat drilled during the year. The Clearfield Bit. Coal Co. No. 1 well (No. 16, Fig. 8, and Table 9) was drilled by Peoples Natural Gas Co. in Jackson Township on the Ebensburg anticline. A show of gas and saltwater were found in the Oriskany at 8,847 feet and the well was abandoned at a total depth of 8,950 feet.

Westmoreland County had 13 wells drilled within its borders during the year. The Kahl Pool in the Blairsville Field had 7 development gas wells completed and 2 dry holes. The best development well in the pool was the Matthew Dale No. 1 (No. 99, Fig. 8, and Table 9) by Peoples Natural Gas Co. in Derry Township. The top of the Oriskany was at 7,810 feet and after fracturing an initial open-flow of 6,000 MCFGPD was gauged at a 9-day rock pressure of 4,332 psi. These dry holes limit the eastern edge of the pool. The Leroy Piper (No. 104, Fig. 8, and Table 9) by T. W. Phillips Gas and Oil Co. in Derry Township encountered a fault and bottomed in Upper Devonian sediments at 7,734 feet; it was plugged back to 3,300 feet where it was finally abandoned after an unsuccessful try at completion as an Upper Devonian Bradford well. The one-well Dry Ridge Pool had a second well completed in it—the Roskovensky No. 1 (No. 105, Fig. 8, and Table 9) by Peoples Natural Gas Co. which found 4,500 MCFGPD in the Oriskany at 7,663 feet after fracturing. The 9-day rock pressure was 4,264 psi. The Beck Pool had a 2-mile outpost drilled to the south of it and it was abandoned above the Tully

limestone. The F. M. Sloan No. 1 well (No. 97, Fig. 8, and Table 9), a wildcat by Fox and Sloan in Franklin Township, was drilled on the Murrys ville anticline in the Murrys ville Field. The Oriskany was found at 7,373 feet and was productive of 2,000 MCFGPD at a 21-day rock pressure of 3,846 psi after fracturing; the well is credited with the discovery of the Sloan Pool. A second wildcat, Booth & Flinn No. 1 (No. 108, Fig. 8, and Table 9) by Devonian Gas and Oil, was drilled on the Chestnut Ridge anticline in Derry Township. The Oriskany was found at 7,410 feet and, after fracturing, produced an estimated 200 MCFGPD at a 7-day rock pressure of 3,000 psi. The well is shut in.

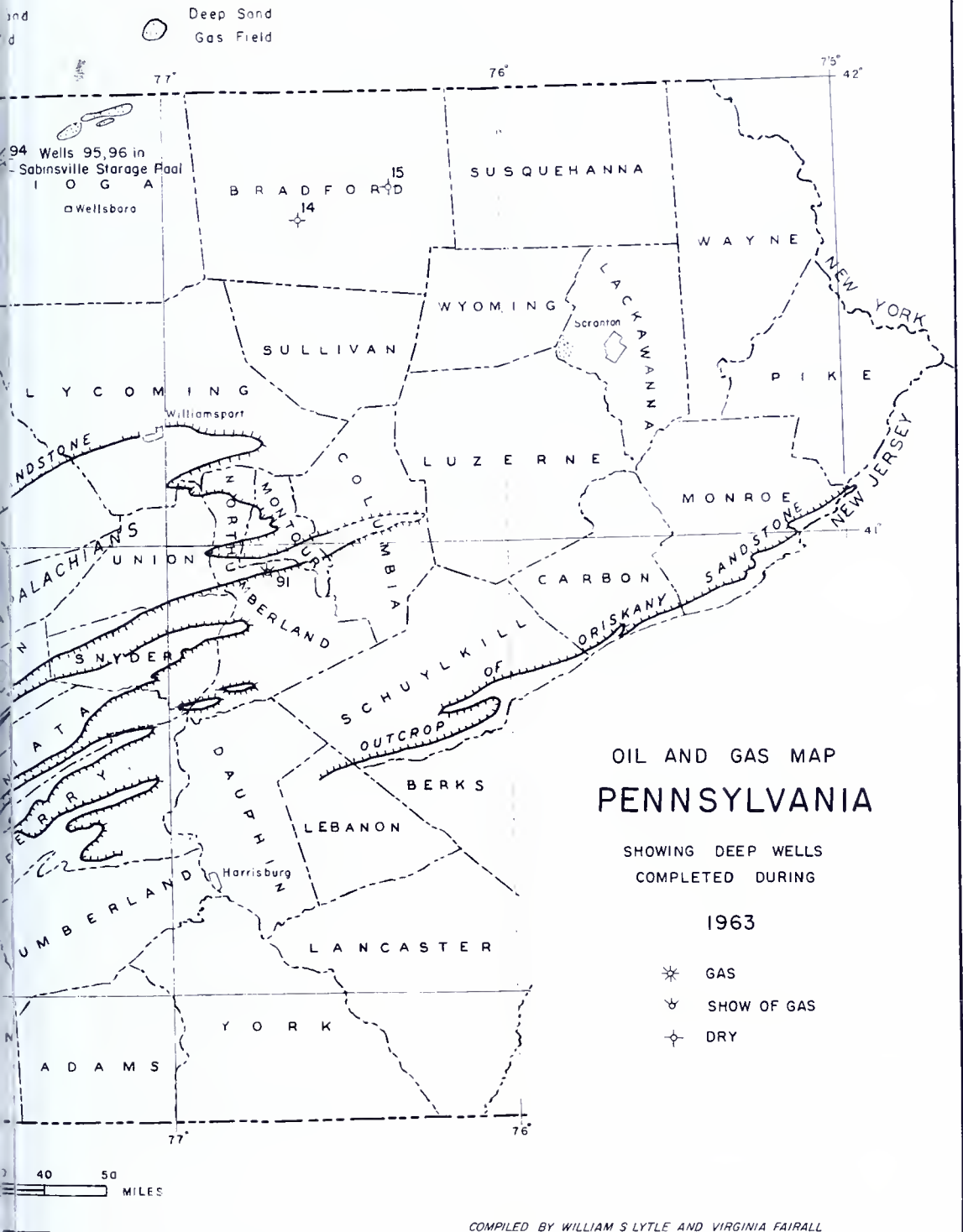
Greene County had a completion on the Bellevernon anticline in Franklin Township where John T. Galey drilled the Laura K. Allison No. 1 (No. 67, Fig. 8, and Table 9) well. The well had a show of gas in the Oriskany at 8,207 feet and was plugged back to 4,192 feet and completed as a shallow Bradford Sand well in the Waynesburg Field; the open-flow was 300 MCFGPD with a rock pressure of 1,215 psi.

Fayette County had 3 completions. All of the wells were wildcats, one discovering a new field. The Grimes No. 1 (No. 64, Fig. 8, and Table 9) by Sun Oil Co. in Wharton Township on the Laurel Hill anticline found gas in the Onondaga Chert at 8,018 feet and Oriskany Sandstone at 8,204 feet. After fracturing the well produced 700 MCFGPD at a 24-hour rock pressure of 3,375 psi; the new field is called the Fike Field. The other two wildcats were drilled on flanking fault blocks on the east side of Chestnut Ridge anticline. Both were drilled by Peoples Natural Gas Co. and Snee and Eberly. Both wells, the G. W. Detwiler No. 1 and the Pa. Games Lands Tr. 51A No. 1, had shows of gas and saltwater in the Onondaga Chert-Oriskany Sandstone interval. The Tr 51A well was abandoned but operations on the Detwiler have been suspended.

Somerset County had one completion, a discovery on the Deer Park anticline—the Nellie R. Mowry No. 1 (No. 93, Fig. 8, and Table 9) by Peoples Natural Gas Co. and Snee and Eberly in Allegheny Township. After reaching the Tuscarora at 9,005 feet and a total depth at 9,275 feet the well was plugged back and the Oriskany was fractured producing 4,190 MCFGPD and saltwater at a 24-hour rock pressure of 1,275 psi; the new field is called the Mt. Zion Field. The gas in the Oriskany was at 3,583 to 3,591 feet.

Bedford County with 12 completions had 1 successful new field wildcat, 1 unsuccessful new field wildcat and 10 development wells. The new discovery was the Marshall E. Diehl No. 1 (No. 4, Fig. 8, and Table 9)







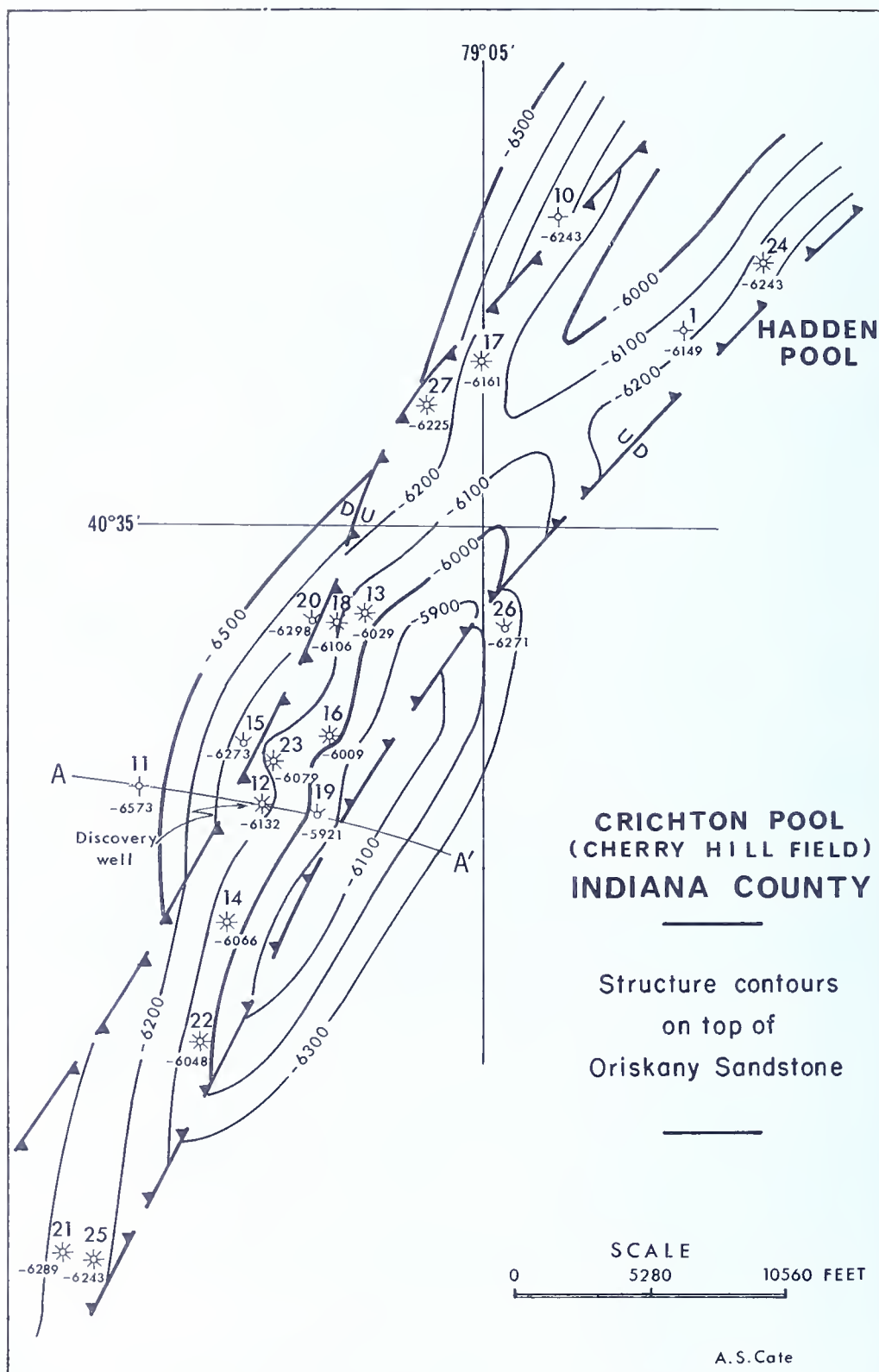


Figure 4. Structure contour map of the Hadden and Crichton Pools, Indiana County.

drilled by New York State Natural Gas Co. and Manufacturers Light and Heat Co. in Mann Township. The well was drilled on a structure between the Purcell and Five Forks Gas Fields both of which are on similar but separate anticlines. The Oriskany was at 4,794 feet and the well reached total depth at 4,883 feet. After fracturing, the initial open-flow was 10,165 MCFGPD at a rock pressure of 1,814 psi. This well discovered the Artemas Field. The second wildcat was drilled on the Wills Mountain anticline on the Mary C. Martin property (No. 13, Fig. 8, and Table 9) by Kerr-McGee Oil Industries Inc. et al in Harrison Township. The well spudded in Martinsburg (Upper Ordovician) and was slated to be a 10,000-foot test. After drilling through the Trenton and Beekmantown, the well went through a fault at 6,174 feet and started drilling Martinsburg again. The beds were overturned and the well penetrated younger and younger beds until drilling was stopped in the Juniata (uppermost Ordovician) at a total depth of 6,677 feet. The well was then abandoned. Elsewhere two development wells were drilled in the Artemas Field, one was a gas producer and the other was a dry hole. Five development gas wells were drilled in the Five Forks Field and three development gas wells were drilled in the Purcell Field. The Grace Snyder No. 1, a development well in the Five Forks Field, produced 18,762 MCFGPD natural.

## INTERESTING NEW ORISKANY GAS FIELDS

### Crichton Pool

Early in 1963 (Jan. 7th) Manufacturers Light and Heat completed Crichton No. 1 in the Cherry Hill Field, the discovery well of what has come to be known as the Crichton Pool. The Crichton Pool is an accumulation in Onondaga Chert and Oriskany Sandstone. It is located, structurally speaking, on a faulted dome and an associated anticlinal nose, and production to date has been limited to the central, "up-faulted" block.

The Crichton Pool seems to be restricted to the west flank of the structural axis. (The one-well Hadden Pool, No. 24 in Figure 4, is to the northeast of the Crichton Pool and on the opposite side of the structural axis.) The productive limits as presently established extend from the Patton and Donnelly wells (No. 17 and No. 27, Figure 4) on the north to the Lindsay Coal wells (No. 21 and No. 25, Figure 4) on the south.

To date ten productive wells have been completed in the field; in addition two wells (No. 18 and No. 19, Figure 4) were marginal and reportedly have never put gas into a line. Water incursion has been a problem for

operators in the pool. Manufacturers Light and Heat and T. W. Phillips Gas and Oil have the two pipelines in the pool. Slightly more than one billion cubic feet was produced during 1963.

It should be noted that the H. B. Strong well (No. 1 in Figure 4 and in the vicinity of the Hadden Pool) probably would have been a producer had it been fractured, but it was drilled in 1954 before fracturing was a common treatment for Oriskany wells in the region. The G. C. Murphy No. 1 (No. 19 in Figures 4 & 5) failed to develop normal rock pressure and, despite its high structural position, was abandoned; perhaps it bottomed in a fault zone.

Average open-flow potential AF .....2718 Mcf

Initial R. P. ....4040-4160 psi.

Average depth to Oriskany .....7706 feet

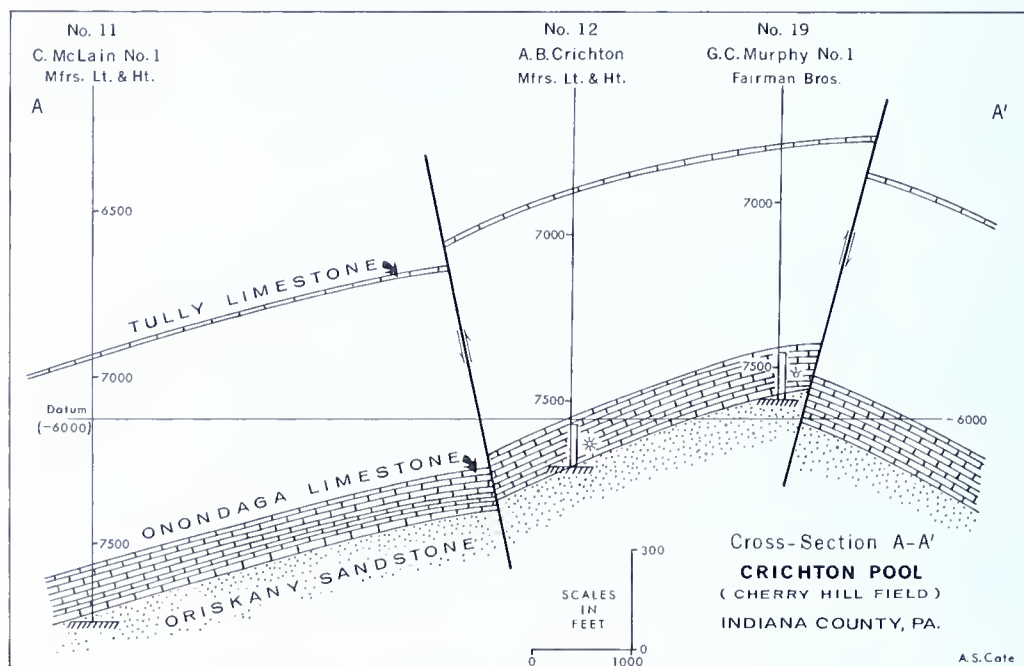


Figure 5. Cross section in the Crichton Pool, Indiana County.

### Kahl Pool

The Kahl Pool was discovered in the Fall of 1962 when Peoples Natural Gas drilled the Kahl No. 1 as an Oriskany test in the Blairsville (shallow gas) Field. In 1954 the F. Litvik No. 1 (No. 6, Figure 6) was drilled and abandoned by Mid East Oil Company; had that well been fractured it very likely would have been a gas producer.

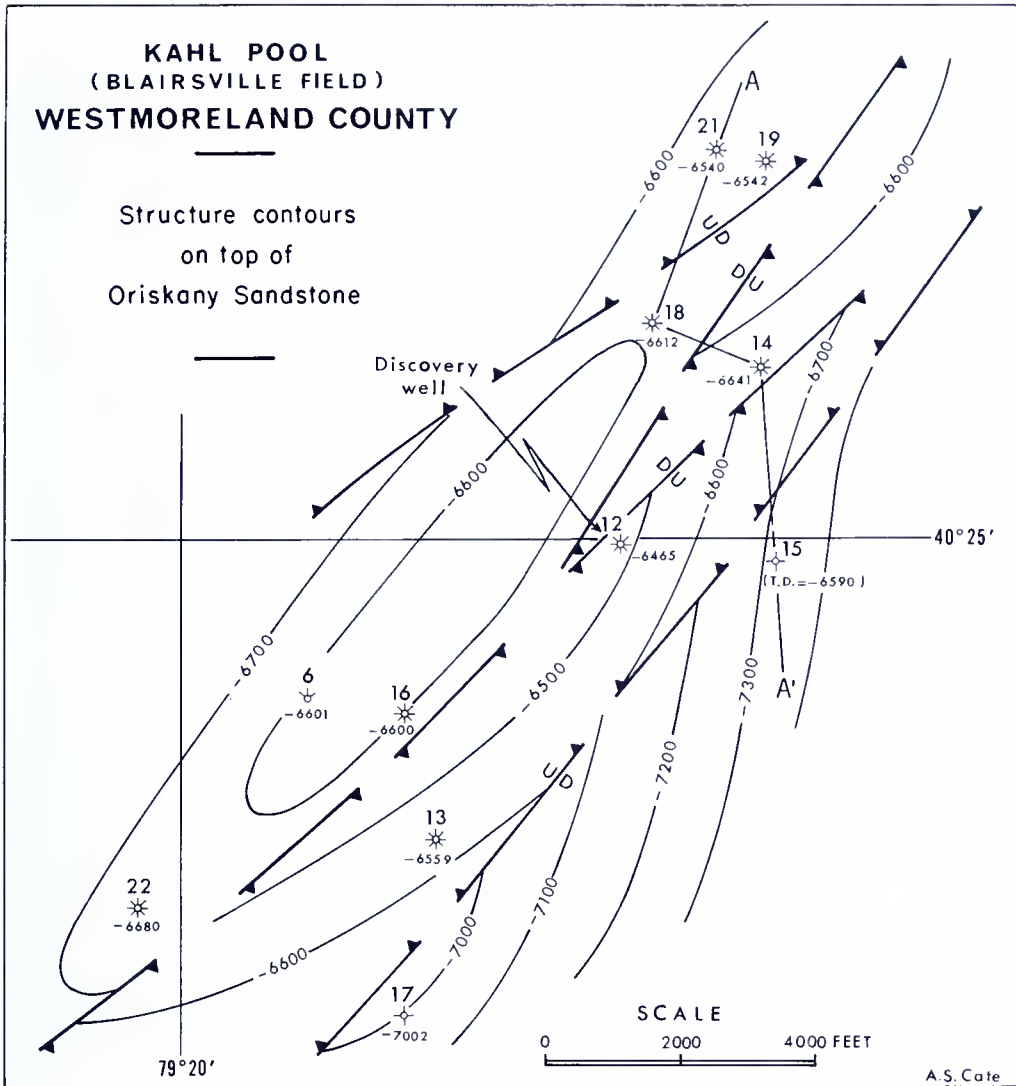


Figure 6. Structure contour map of the Kahl Pool, Westmoreland County.

The pool is on a faulted dome along the Fayette anticline; the accumulation is in the Onondaga Chert-Oriskany Sandstone interval.

As of this date there are eight producing gas wells in the pool. Peoples Natural Gas and T. W. Phillips buy the gas from the reservoir. More than three billion cubic feet of gas was produced from the pool in 1963.

Average open-flow potential AF .....	3770 Mcf
Initial R. P. ....	4372 psi.
Average depth to Oriskany .....	7773 feet



## OUTLOOK FOR 1964 IN DEEP EXPLORATION

Several wildcats completed or drilling early in 1964 are being closely watched by the oil and gas operators. One is the Joseph Scull well by Transamerican Petroleum in Spring Township, Crawford County. The well is a deeper pool test in the Indian Spring Pool which produces gas from the Medina. A flow of 7,000 MCFGPD (thousand cubic feet of gas per day) was found in the Gatesburg (Upper Cambrian) at 6,312 feet. At present the well is shut in awaiting connection to a pipeline. This is the first (potential) commercial Gatesburg producer in the State and should create a flurry of deeper drilling in the area.

The L. F. Heyn No. 1 well in South Union Township, Fayette County found gas in the Tuscarora at 11,244 feet. The open-flow amounted to 1,856 MCFGPD at a 96-hour rock pressure of 4,457 psi. This well will probably justify some deeper drilling inasmuch as it is the first test of the Lower Silurian in the foreland folds of Pennsylvania.

The J. F. Long No. 1 well by Mobil Oil Co. in Centre County is located on the Nittany Arch. The well spudded in Gatesburg (Upper Cambrian) and has cut two thrust faults; at the last report the well was drilling in the Rose Hill (Middle Silurian) below 9,200 feet.

A fourth wildcat, the Robert D. Shumaker by Shell Oil Co. in Brothers Valley Township, Somerset County on the Negro Mountain anticline, has found 1,364 MCFGPD at a 19-hour rock pressure of 3,350 psi. in the Oriskany. Activity should pick up in this area.

The four wildcat wells discussed above were active in 1964 and should give impetus to gas exploration in the State early in the year. If the rest of 1964 is like the first two months Pennsylvania should have a very active year.

## ARTICLES ON PENNSYLVANIA GEOLOGY, 1963

Arndt, H. H., Donilchik, Wolter, and Wood, G. H., Jr., (1963), *Geology of onthrocite in the western part of the Shomokin quadrangle, Northumberland County, Pennsylvania*, U. S. Geol. Survey, Coal Inv. Map C-47, 2 sheets, scale 1:12,000.

———, Wood G. H., Jr., and Donilchik, Wolter (1963), *Geology of onthrocite in the southern part of the Trevorton quadrangle, Northumberland County, Pennsylvania*, U. S. Geol. Survey, Coal Inv. Map C-48, 2 sheets, scale 1:12,000.

Corswell, L. D. and Bennett, G. D. (1963), *Geology and hydrology of the Neshonock quadrangle, Mercer and Lawrence Counties, Pennsylvania*, Po. Geol. Survey, 4th ser., Bull. W15, 90 p., 2 pl.

Colton, G. W. (1963), *Bedrock geology and surface structure of the Cedar Run quadrangle, Tioga and Lycoming Counties, Pennsylvania*, Po. Geol. Survey, 4th ser., Prog. Rept. 164.



- Dennison, J. M. and Woodward, H. P. (1963), *Palinspastic maps of central Appalachians*, Am. Assoc. Petroleum Geologists Bull., v. 47, no. 4, p. 666-680.
- Dyson, J. L. (1963), *Geology and mineral resources of the New Bloomfield quadrangle*, Po. Geol. Survey, 4th ser., Atlas A137 A & B, 63 p.
- Eckord, W. E. (1963), *Evaluation of Appalachian area reservoirs for increased oil recovery*, Producers Monthly, v. 27, no. 3, p. 14-20.
- Frokes, L. A., Glaeser, J. D., Wagner, W. R., Wietrzykowski, J. F. (1963), *Stratigraphy and structure of Upper and Middle Devonian rocks in northeastern Pennsylvania*, Guidebook, 28th Field Conf. of Pa. Geologists, 44 p.
- Green, W. D. and Damon, P. E. (1963), *Age of Cornwall, Pennsylvania magnetite ore*, Econ. Geology, v. 58, no. 1, p. 143-144.
- Hobson, J. P. (1963), *Stratigraphy of the Beekmantown Group in southeastern Pennsylvania*, Pa. Geol. Survey, 4th ser., Bull. G37, 331 p.
- Kinney, G. T. (1963), *Appalachian deep play to pick up steam*, Oil and Gas Jour., v. 61, no. 19 (May 13), p. 53-55.
- Koppe, E. F. (1963), *Petrography of the Upper Freeport Coal, Harmar and Springdale Mines, Allegheny and Westmoreland Counties, Pennsylvania*, Pa. Geol. Survey, 4th ser., Bull. M48, 43 p.
- Lessig, H. D. (1963), *Colcutt Silt, a very early Pleistocene deposit, upper Ohio Valley*, Geol. Soc. America Bull. v. 74, no. 2, p. 129-140.
- Lytle, W. S. (1963), *Underground gas storage in Pennsylvania*, Po. Geol. Survey, 4th ser., Bull. M46, 31 p., 14 pl.
- , (1963), *Preliminary report of the oil and gas geology of the Warren quadrangle, Warren County, Pennsylvania*, Po. Geol. Survey, 4th ser., Prog. Rept. 163.
- , (1963), *Developments in Pennsylvania in 1962*, Am. Assoc. Petroleum Geologists Bull., v. 47, no. 6, p. 940-955.
- , (1963), *Pennsylvania—Oil and gas development 1962*, International Oil Scouts Assoc. Yearbook 1963 (Review of 1962), v. 33, pt. 1, p. 271-280, pt. 2, p. 281-288.
- , Cote, A. S., McGlode, W. G., and Wogner, W. R. (1963), *Oil and gas developments in Pennsylvania in 1962*, Pa. Geol. Survey, 4th ser., Prog. Rept. 165, 44 p.
- McAlester, A. L. (1963), *Pelecypods as stratigraphic guides in the Appalachian Upper Devonian*, Geol. Soc. America Bull., v. 74, no. 10, p. 1209-1224.
- Meisler, Harold (1963), *Hydrogeology of the carbonate rocks of the Lebanon Valley, Pennsylvania*, Po. Geol. Survey, 4th ser., Bull. W18, 81 p., 3 pl.



- Patten, E. P., Jr. and Bennett, G. D. (1963), *Methods of flow measurement in well bares*, Pa. Geol. Survey, 4th ser., Bull. W17, 28 p.
- , (1963), *Application of electrical and radioactive well logging to ground-water hydrology*, Pa. Geol. Survey, 4th ser., Bull. W19, 60 p.
- Pittsburgh Geol. Society and Appalachian Geol. Society (1963), *Guidebook, Tectonics and Cambrian-Ordovician Stratigraphy in the central Appalachians of Pennsylvania*, 129 p.
- Poth, C. W. (1963), *Geology and hydrology of the Mercer quadrangle, Mercer, Lawrence, and Butler Counties, Pennsylvania*, Pa. Geol. Survey, 4th ser., Bull. W16, 149 p., 4 pl.
- , (1963), *The ground-water observation-well program in Pennsylvania*, Pa. Geol. Survey, 4th ser., Bull. W20, 18 p.
- Rodgers, John (1963), *Mechanics of Appalachian foreland folding in Pennsylvania and West Virginia*, Am. Assoc. Petroleum Geologists Bull., v. 47, no. 8, p. 1527-1536.
- Rough, R. L. and Eckard, W. E. (1963), *Results of hydraulic fracturing in shallow oil sands, Warren County, Pa.*, Producers Monthly, v. 27, no. 8 (Aug.) p. 9-15.
- Sanders, J. E. (1963), *Late Triassic tectonic history of Northeastern United States*, Am. Jour. Sci., v. 261, no. 6, p. 501-524.
- Seifert, W. H. and Lytle, W. S. (1963), *Oil and gas developments in the Youngsville-Sugar Grove Field of Warren County, Pennsylvania*, Pa. Geol. Survey, 4th ser., Prog. Rept. 162, 13 p.
- Shaffner, M. N. (1963), *Geology and mineral resources of the Danegal quadrangle, Pennsylvania*, Pa. Geol. Survey, 4th ser., Atlas A48, 116 p. 4 pl.
- Shepps, V. C., ed. (1963), *Symposium of Middle and Upper Devonian stratigraphy in Pennsylvania and adjacent states*, Pa. Geol. Survey, 4th ser., Bull. G39, 301 p.
- Thompson, R. R. (1963), *Lithostratigraphy at the Middle Ordovician Salona and Coburn Formations in central Pennsylvania*, Pa. Geol. Survey, 4th ser., Bull. G38, 154 p.
- Thomson, R. D., Otte, M. E., and Ela, R. E. (1963), *The mineral industry of Pennsylvania in 1961*, Pa. Geol. Survey, 4th ser., Inf. Circ. 50, 42 p.
- Wheeler, H. E. (1963), *Post-Sauk and Pre-Absaroka Paleozoic stratigraphic patterns in North America*, Am. Assoc. Petroleum Geologists Bull., v. 47, no. 8, p. 1497-1526.
- Wood, G. H., Jr., Arndt, H. H., and Hoskins, D. M. (1963), *Geology of the southern part of the Pennsylvania anthracite region*, Guidebook Field Trip No. 4, Ann. meeting, Geol. Soc. America.
- Wood, G. V. and Griffiths, J. C. (1963), *Modal analysis of three quartzites and their textural implications*, Jour. Geology, v. 71, no. 4, p. 405-421.

TABLE 8. Deep gas production in Pennsylvania, 1963  
Production in Mcf

County	Field	Pool	Discovery Date	Cumulative Production at End of 1962	Production 1963	Cumulative Production at End of 1963	Status of Field or Pool at End of 1963
Armstrong	.....Shellhammer	Rupert	11/14/58	292,246	21,851	314,097	Producing
			("Shallow" gas production of Shellhammer Field not shown above)				
Bedford	.....Artemas		7/30/63			1,100,000	Producing
	Five Forks		6/21/62	Turned into line 1962		7,700,000	Producing
	Purcell		12/14/57	Turned into line 1962		2,200,000	Producing
Bedford & Blair	.....Pavia		11/20/61				Shut In
Cameron & Elk	.....Whippoorwill		7/10/61	5,250,000	3,450,000	8,700,000	Producing
Cameron, Elk, Punxsutawney- & Jefferson ...	Driftwood		9/15/51	420,900,000	11,250,000	432,150,000	Producing
<u>TOTAL:</u>							
Clearfield, & Indiana	.....	Benezette Driftwood	1/5/53 9/15/51	228,700,000	2,600,000	231,300,000	Producing
		Boone Mt.	9/18/58				
		DuBois	1/6/60	83,000,000	4,700,000	87,700,000	Producing
		Sabula	8/26/63		50,000	50,000	Producing
		Helvetia	5/11/60				
		Reed-	5/9/55				
		Deemer	12/1/53				
		Rockton	2/25/55	106,200,000	3,700,000	109,900,000	Producing
		Sykesville	11/10/60				
		Hicks Run	6/7/56	3,000,000	200,000	3,200,000	Producing
Clarion	.....Clarion	Mays	10/30/63				Shut In

("Shallow" gas production in Clarion Field also exists)

Clinton & Leidy Potter .....	1/9/50 1/9/59	158,352.832 3,552.800	462,000 462,000	158,814,832 4,014,800	Gas Storage & Producing
Crawford & Conneaut Erie .....	2/11/57 12/31/58	1,887,645 376,725	1,327,367 558,791	3,215,012 935,516	Producing & Shut In Producing
	9/11/57 7/14/62 11/9/61	1,419,970 90,950	618,556 150,020	2,038,526 240,970	Producing Shut In Producing
Erie .....	10/17/60 4/29/47 5/20/53 8/23/46	58,170 967,352 113,652 4,886,600	18,935 10,759 10,759 3,809	77,105 978,111 124,411 4,890,409	Producing Gas Storage & Producing Producing Oriskany Gas Storage (1 producing Medina well)
	7/17/56 8/8/63 12/28/59 10/13/61 3/24/38	5,000 1,619,455 39,545,921	5,000 15,711 569,564 454,973	5,000 15,711 2,189,019 40,000,894	Shut In Producing Producing Shut In Producing
Fayette .....	12/31/60 3/24/38 5/9/42 1/9/63 7/11/63	26,054 20,114,469 19,405,398	1,096 136,661 317,216 1,056,248	27,150 20,251,130 19,722,614 1,056,248	Producing Producing Producing Producing
Indiana .....	("Shallow" gas production in Cherry Hill Field not shown above)				
	9/21/56 9/30/56	17,472,000 5,750,000	764,666 250,000	18,236,666 6,000,000	Producing Producing
Jacksonville Nolo	9/1/33 1/2/39 9/1/33 7/16/36	79,500,000 79,500,000	100,000 100,000	79,600,000 79,600,000	Storage Storage Storage
Ellisburg	10/2/39 4/2/62	1,570,460	431,234	2,001,694	Producing
Potter .....	11/11/58 11/11/58 6/16/60 8/21/63	5,299,424 4,944,164 355,260	1,108,470 977,728 130,742	6,407,894 5,921,892 486,002	Producing Producing Producing Shut In
Ulysses					
Somerset .....					
Boswell					
Mt. Zion					

TABLE 8. Deep gas production—Continued

County	Field	Pool	Discovery Date	Cumulative Production at End of 1962	Production 1963	Cumulative Production at End of 1963	States of Field or Pool at End of 1963
Warren .....	Camp Run		5/12/61			13,000	Producing
Washington .....	Daniels Run	Clyde	9/6/61	12,470	13,623	26,093	Producing
		("Shallow" gas production of Daniels Run Field not shown above)					
Westmoreland ..	Blairsville	Kahl	10/23/62	88,271	4,697,495	4,785,766	Producing
		("Shallow" gas production of Blairsville Field not shown above)					
	Latrobe	Dry Ridge	8/25/46	406,425	197,452	603,877	Producing
		("Shallow" gas production of Latrobe Field not shown above)					
	Jacobs Creek	Bailey	12/26/61	100,650	86,778	187,428	Producing
		("Shallow" gas production of Jacobs Creek Field not shown above)					
	Lycippus	<u>TOTAL:</u>	8/17/49	4,667,139	248,314	4,915,453	Producing
		Derry	12/5/58	63,368	17,745	81,113	Producing
		Piper	8/17/49	639,140	9,105	648,245	Producing
		St. Boniface	9/13/56	3,964,631			Producing
		Chapel			221,464	4,186,095	Plugged & Abd. 1963
		Hribal	8/17/62				Shut In
	Murrysville	Sloan	10/22/63				
		("Shallow" gas production of Murrysville Field also exists)					
Westmoreland & Somerset ..	Johnstown	<u>TOTAL:</u>	5/16/57	10,721,423	2,376,648	13,098,071	Producing
		Baldwin	5/22/60	3,485,215			
		Beck	5/16/57		1,005,328	4,490,543	Producing
		Williams	2/14/58	7,236,208	1,371,320	8,607,528	Producing
	Seven Springs	<u>TOTAL:</u>	12/5/58	3,634,299	482,283	4,116,582	Producing
		Blair	12/5/58	3,089,642	407,215	3,496,857	Producing
		Clarke	3/15/61	273,670	51,958	325,628	Producing
		Kooser	5/19/59	270,987	23,110	294,097	Producing

Table 9. Summarized records of deep wells drilled in Pennsylvania in 1963.

SHEET 1

COUNTY	Armstrong	Bedford	Bedford	Bedford	Bedford	Bedford	Bedford	Bedford	Bedford	Bedford
MAP NUMBER	1	2	3	4	5	6	7	8	9	10
NAME OF WELL	W. B. Porter 2	Ivan E. Davis 2	Ivan E. Davis 3	Marshall E. Diehl 1	Marshall E. Diehl 2	James Lewis 1	Morrell Bros. 1	Pa. Tract 122 F-161	Talbert Smith 1	Grace Snyder 1
OPERATOR	NYSNG Corp. N-890	NYSNG Corp. N-875	NYSNG Corp. N-881	NYSNG Corp. & M.L.H. Co N-879	NYSNG Corp. & M.L.H. Co N-891	NYSNG Corp. & M.L.H. Co N-893	NYSNG Corp. N-878	Felmont Oil Corp. F-161	NYSNG Corp. N-886	NYSNG Corp. N-885
TOWNSHIP	South Bend	Monroe	Monroe	Mann	Mann	Mann	Mann	Southampton	Mann	Mann
QUADRANGLE	Elders Ridge E 41	Clearville E 15	Clearville E 22	Clearville G 18	Clearville G 21	Clearville G 23	Clearville H 16	Clearville H 17	Clearville H 19	Clearville G 20
LATITUDE	13,000 ft. S 40° 40'	6200 ft. N 39° 50'	9300 ft. N 39° 50'	5700 ft. N 39° 45'	2800 ft. N 39° 45'	8100 ft. N 39° 45'	13,550 ft. S 39° 50'	3200 ft. S 39° 50'	16,450 ft. S 39° 50'	5500 ft. S 39° 50'
LONGITUDE	4750 ft. E 79° 25'	4100 ft. E 78° 25'	5800 ft. E 78° 25'	1650 ft. W 78° 25'	2600 ft. W 78° 25'	600 ft. W 78° 25'	10,700 ft. W 78° 20'	900 ft. E 78° 25'	11,850 ft. W 78° 20'	800 ft. W 78° 25'
DATE COMPLETED	12-30-63	5-2-63	11-26-63	7-30-63	9-22-63	12-31-63	6-3-63	7-12-63	10-9-63	9-23-63
ELEVATION *	1018 OF	1482 RT	1450 DF	1111 DF	1150 KB	1186 DF	963 KB	1553 KB	966 KB	1509 KB
TULLY	1) 6752) repeated 2) 6936) faulting by	Clearville: 3862- Oolitic: 4143- Purcell: 5392-	Clearville: 11421- Oolitic: 34304- Purcell: 5586-	Clearville: 2820- Oolitic: 2387- Purcell: 4505-	Clearville: 3003- Oolitic: 1155- Purcell: 4495-	Clearville: 2030- Oolitic: 3685- Purcell: 4723-	Clearville: 2560- Oolitic: 2777- Purcell: 4202-	Clearville: 4074- Oolitic: 15106- Purcell: 4378243	Clearville: 2860- Oolitic: 3123-	Clearville: 6000- Oolitic: 4233- Purcell: 5316-
ONONDAGA	7545- CHERT	1) 5632) repeated 2) 5686) faulting by	5798-	4704	4667-	5065-	4749-	5562-	4804-	5473-
DRISKANY	7707-7721 SW	5821- Gas	5908- Gas	4794- Gas	4768- Gas	5132- SSC & SW	4897- Gas	5670- Gas	4974- Gas	5576- Gas
HELDERBERG	7721-						5050-			
SALINA							Keyser: 5160- Tonoloway: 5270-			
GUELPH-LOCKPORT										
MEDINA	RED MEDINA (GRIMSBY)									
WHITE MEDINA (WHIRLPOOL)										
QUEENSTON										
TOTAL DEPTH	7751	6065	6065	4883	4893	5290	5311	5720	5090	5791
DEEPEST FORMATION REACHED	Helderberg?	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Tonoloway	Oriskany	Oriskany	Oriskany
RESULT **	3 gal SW AF PB to 3225 Attempted to complete as shallow storage well Abandoned	1854 Mcf gas AF RP 1643 psi 8 days	277 Mcf gas AF 1293/77 hrs	10,165 Mcf gas AF RP 1814 psi Discovery Well Artemas Field	24,915 Mcf gas (natural) RP 1778 psi 24 hrs	Abandoned	3482 Mcf gas AF RP 1844 psi 10 days	13,700 Mcf gas (natural) RP 1526 psi 27 hrs	9890 Mcf gas (natural) & SW RP 1408 psi 52 hrs	18,762 Mcf gas (natural) RP 1405 psi 34 hrs

\* DF Derrick Floor \*\* SW Salt Water  
C Grounded PB Plugged Back  
KB Kelly Bushing AF After Fracturing  
RT Rotary Table RP Rock Pressure

ALL ELEVATIONS AND DEPTHS ARE IN FEET



Table 9. Deep well records, continued.

COUNTY	Bedford	Bedford	Bedford	Bedford	Bradford	Bradford	Bradford	Cambria	Cameron	Clarion	Clearfield	Clearfield
MAP NUMBER	11	12	13	14	15	16	17	18	19	20		
NAME OF WELL	Paul Snyder 2	L. H. Wallace 1	Harry C. Martin 1	Headlee 1	H. W. Lundy 1	Clearfield Bit. Coal Co., 1	A. Pardee Est. 11	J. A. Mays 1	G. Koppenhaver 1	P. Swilstock 1		
OPERATOR	NYSNG Corp. N-871	NYSNG Corp. N-862	Kerr-McCree Oil Industries Inc.	Obie Shaw 1	Fairman Drig. Co. Mobil and Shell	The Peoples Nat. Gas Co.	NYSNG Corp. N-892	Paul Schaeffer et al	Lee E. Hinton 1	NYSNG Corp. N-880		
TOWNSHIP	Monroe	Monroe	Harrison	W. Burlington	Standing Stone	Jackson	Lumber	Clarion	Brady	Bigler		
QUADRANGLE	Clearville E 13	Clearville E 14	Hyndman B 1	Powell B 3	Towanda I 3	Johnstown F 2	Driftwood D 109	Clairon B 2	Ou Bols I 39	Houtzdale E 5		
LATITUDE	4300 ft. N 39° 50'	6500 ft. N 39° 50'	10,600 ft. N 39° 55'	10,500 ft. S 41° 45'	18,050 ft. S 41° 50'	3200 ft. S 40° 25'	3450 ft. S 41° 25'	8900 ft. N 41° 10'	16,900 ft. S 41° 05'	9700 ft. N 40° 50'		
LONGITUDE	3000 ft. E 78° 20'	2650 ft. W 78° 20'	5900 ft. W 78° 35'	6000 ft. W 76° 35'	2200 ft. W 76° 20'	7000 ft. E 78° 50'	4500 ft. E 78° 15'	10,400 ft. W 79° 20'	400 ft. W 78° 45'	1200 ft. E 78° 20'		
DATE COMPLETED	2-21-63	3-12-63	2-19-63	12-2-63	1-12-63	2-1-63	11-15-63	10-30-63	12-7-63	6-14-63		
ELEVATION	1499 DF	1085 OF	1808 KB	1118 DF	1381 KB	2133 KB	1380 OF	1450 OF	1795 KB	1529 KB		
TULLY	Clearville: 3717- Golfic: 3931 Purcell: 4531	Clearville: 2952- Golfic: 4250- Purcell: 4250-	Trenton: 1462- Beekmantown: 2529- Fault @ 6174-	2188-2385	4368-4477	Purcell: 8660- 8738- 8762-	5905-	5417-	6680-	7003-7051		
ONONOAGA CHERT	5556- 215310	4512-		3839-	6196-		6548- 6560-	5762- 5773- Gas	7352- 7377-	7922- 7943-		
ORISKANY	5699- Gas	4608- Gas	Martinsburg: 6174- Oswego: 6350- Junata: 6524-	4013- SW	6468-	8847- SG & SW	6575- SW	5832-5845 Gas & SW	7434- Gas & SW	7995-8010		
HELLERBERG												
SALINA								6023-				
GUELPH-LOCKPORT								7065-				
MEDINA								1 round: 7466-7475 7598- SG				
WHITE MEDINA (WHIRLPOL)								7814-				
QUEENSTON								7824				
TOTAL DEPTH	6013	4810	6677	4104	6610	8950	6625	7890	7456	8035		
DEEPEST FORMATION REACHED	Helderberg ?	Oriskany	Junata	Oriskany	Oriskany ?	Oriskany	Helderberg	Queenston	Oriskany	Helderberg		
RESULT	6493 Mcf gas (natural) RP 1405 psi 4.5 hrs	909 Mcf gas (natural) RP 1405 psi 4 days	Abandoned	Abandoned	Abandoned	SG & SW AF Abandoned	Abandoned	400 Mcf gas & SW AF RP 2500 psi Discovery Well	60 Mcf gas & SW AF Abandoned	Dry Abandoned (Not Fractured)		

\*: faulted

Table 9. Deep well records, continued.

COUNTY	Clearfield	Clinton	Crawford	Crawford	Crawford	Crawford	Crawford	Crawford	Crawford	Crawford
MAP NUMBER	21	22	23	24	25	26	27	28	29	30
NAME OF WELL	Green Glen Corp 4	Pa Tract 102	Brown	H.A. Greenfield	Harold Hook	W Procop	Harry W Ranson 2	Sobleski	Vorhees	J. L. Morris
OPERATOR	NYSKG Corp (N-889) and Dav. G. & O. Co.	Phillips Petroleum Co.	Nemac	The Sylvania Corp.	Transamerican Petroleum Corp.	Transamerican Pet. Corp.	The Sylvania Corp.	Transamerican Pet. Corp.	Transamerican Pet. Corp.	Transamerican Pet. Corp.
TOWNSHIP	Sandy	Beech Creek	Beaver	Spring	Summerhill	Spring	Spring	Spring	Beaver	Summerhill
QUADRANGLE	Penfield A 277	Howard A 3	Girard G 109	Girard H 107	Girard H 91	Girard H 96	Girard H 104	Girard H 89	Girard O 110	Llnessville C 19
LATITUDE	3300 ft. N 410 10'	5700 ft. N 410 10'	2800 ft. N 410 45'	4000 ft. N 410 45'	700 ft. N 410 45'	4300 ft. N 410 45'	9700 ft. N 410 45'	4000 ft. N 410 45'	1400 ft. N 410 50'	2700 ft. S 410 45'
LONGITUDE	350 ft. W 780 40'	6700 ft. W 770 40'	2500 ft. W 800 25'	7900 ft. E 800 25'	9200 ft. E 800 25'	8900 ft. E 800 25'	7600 ft. E 800 25'	4800 ft. E 800 25'	7800 ft. W 800 25'	8800 ft. W 800 15'
DATE COMPLETED	8-26-63	1-2-63	12-18-63	10-15-63	2-4-63	5-11-63	8-23-63	1-10-63	10-11-63	3-18-63
ELEVATION	1644 KB	1805 KB	1122 G	1032 KB	1030 RT	1035 ± G	948 OF	1055 DF	1000 OF	1305 OF
TULLY	6766-6872	7320-7485		2130-2145						
ONONDAGA	7342-	8368-	2395-	2338-	2336-	2280-	2266-	2352-	2150-	2711-
ORISKANY	7411-7439 Gas	8414- Gas	2583- SG & SW		2505-2512	2450-	2472-	2553-		2905- SW
HELDERBERG										
BASS ISLAND							SG & SW @ 2481	SW	SW @ 2394	
SALINA				SW @ 2541	SW @ 2543					
GUELPH-LOCKPORT			BW @ 3485-		3258-	3180-	BW @ 3285	3254-	2965- BW @ 3160	3620- BW @ 3780
CLINTON										
IRONDEQUOIT										
MEDINA										
RED MEDINA (GRIMSBY)										
WHITE MEDINA (WHIRLPOOL)										
QUEENSTON										
TOTAL DEPTH	7443			3790-		3730-				4190-
DEEPEST FORMATION REACHED	Helderberg									
RESULT	9191 Mcf gas AF RP 381.3 psi 463 hrs Discovery Well Sabula Pool	67 Mcf gas AF Abandoned	750 Mcf gas AF RP 1000 psi 15 hrs	330 Mcf gas AF RP 890 psi 16 days	1000 Mcf gas AF RP 1080 psi 30 hrs. Shut in	1121 Mcf gas AF RP 1200 psi 4 days Shut in	280 Mcf gas AF RP 1010 psi 41 hrs.	500 Mcf gas AF RP 940 psi 48 hrs. Shut in	Queenston Suspended May drill deeper	Queenston 150 Mcf gas In Medina Abandoned



Table 9. Deep well records, continued.

COUNTY	Crawford	Crawford	Crawford	Crawford	Crawford	Crawford	Crawford	Crawford	Elk	Erie	Erie	Erie
MAP NUMBER	41	42	43	44	45	46	47	48	49	50		
NAME OF WELL	McKim-Gaut	Newhard	Roy Payne	Spanovich	Stebbins-Greenlee	A. Williams	A. J. Palumbo	Hammermill	N Beam	B. Blood		
OPERATOR	Transamerican Pet. Corp.	Transamerican Pet. Corp.	Transamerican Pet. Corp.	Transamerican Pet. Corp.	Ventura Oil Co. and Transam. Pet. Corp.	Transamerican Pet. Corp.	NMSG Corp. N-874	Hammermill Paper Co.	Pa Gas Co.	Paul Britton et al		
TOWNSHIP	Hayfield	Hayfield	Hayfield	Hayfield	Hayfield	Hayfield	Jay	City of Erie	Conneaut	Conneaut		
QUADRANGLE	Meadville A 7	Meadville A 6	Meadville A 14	Meadville A 17	Meadville A 5	Meadville A 9	Benedict G 298	Erie F 109	Girard D 103	Girard D 92		
LATITUDE	10-550 ft. N 41° 40'	8150 ft. S 41° 45'	15-250 ft. S 41° 45'	450 ft. S 41° 45'	700 ft. S 41° 45'	6900 ft. S 41° 45'	11,600 ft. S 41° 20'	6800 ft. S 42° 10'	11,950 ft. S 41° 50'	2200 ft. S 41° 55'		
LONGITUDE	6000 ft. E 80° 15'	12,500 ft. W 80° 10'	2000 ft. W 80° 10'	5200 ft. E 80° 15'	8800 ft. S 80° 15'	2600 ft. W 80° 15'	2900 ft. E 780 30'	8500 ft. E 800 10'	6200 ft. E 800 30'	2100 ft. E 800 30'		
DATE COMPLETED	4-5-63	2-28-63	10-31-63	12-16-63	2-9-63	6-5-63	3-9-63	3-28-63	8-7-63	2-12-63		
ELEVATION	1142 KB	1207 KB	1384 KB	1094 G7	1153 KB	1238 KB	1719 KB	629	945 DF	874 DF		
TULLY			2824-88	2380-	2450-2508	2600-68	6393-6500	1128-1216				
ONONDAGA	2692-	2720-	3009-	2560-	2630-	2789-	6982- chert 7002-	1346-1598 556 @ 1579-89	1908-	1771-		
ORISKANY			3202-05		2832-2843	2982-88	7042-7068	1598-1611	2198-2209	2054-2080		
HELDERBERG												
BASS ISLAND	SW @ 2930	SW @ 2930	3205-			2988-	Akron-Bertle: 7153-	1611- SW @ 1631-51	2209-	2080-		
SALINA			3269-			3059-		1688-	2284-	2158-		
GUELPH-LOCKPORT	3635- BW @ 3785	3640-	3920-	3458-	3541-	3700-		2056- SW @ 2206-45	2798-	2659-		
CLINTON												
IRONDEQUOIT	3984-	3980-	4180- 4276-84	3810-	3884-3892	3962- 4045-4053			3064- 3130-42	2932- 2986-2998		
MEDINA												
WHITE MEDINA (WHIRLPOOL)	SSG	Gas @ 4130	4318- SG	Gas	Gas @ 3993	4088- Gas			3160- Gas	3016- Gas		
QUEENSTON	4208-	4204-	4504-	4032-	4101-	4268-			3320-			
TOTAL DEPTH	4235	4247	4529	4061	4146	4279	7200	2302	3337	3144		
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Akron-Bertle	Lockport	Queenston	Medina		
RESULT	Abandoned	756 Mcf gas AF RP 1205 psi 92 hrs	Abandoned AF	778 Mcf gas AF 1150 psi 24 hrs	1620 Mcf gas AF RP 1240 psi	476 Mcf gas AF RP 1040 psi 48 hrs	Dry Abandoned	Drilled for waste disposal	120 Mcf gas AF 960#/9 hrs.	633 Mcf gas AF 100#/5 days		



Table 9. Deep well records, continued.

COUNTY	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie
MAP NUMBER	51	52	53	54	55	56	57	58	59	60			
NAME OF WELL	F. A. DeLong	F. A. DeLong	Dorchester	J & J Gage	J. Harrington	Jim Heaton	N. W. Phillips	N. W. Phillips	J. Root	A. Richards			
OPERATOR	Worldwide Pet. Co.	Worldwide Pet. Co.	Newmac Oil & Gas Co.	Newmac Oil	Pa Gas Co. No. 1602	Worldwide Pet. Co.	Newmac Oil & Gas Co.	Newmac Oil & Gas Co.	Pa Gas Co. & Felmont Oil Corp.	Grantley Co.			
TOWNSHIP	Conneaut	Conneaut	Conneaut	Conneaut	Conneaut	Conneaut	Conneaut	Conneaut	Elk Creek	Conneaut			
QUADRANGLE	Girard D 97	Girard D 106	Girard B 93	Girard E 100	Girard D 98	Girard E 108	Girard D 101	Girard D 105	Girard E 90	Girard D 94			
LATITUDE	7750 ft. S 41° 55'	6650 ft. S 41° 55'	550 ft. N 41° 55'	5900 ft. S 41° 55'	10,900 ft. S 41° 55'	14,000 ft. S 41° 55'	16,000 ft. S 41° 55'	17,700 ft. S 41° 55'	13,250 ft. S 41° 55'	14,350 ft. S 41° 55'			
LONGITUDE	11,150 ft. W 80° 25'	9200 ft. W 80° 25'	7900 ft. E 80° 25'	8000 ft. W 80° 20'	7800 ft. E 80° 30'	1400 ft. E 80° 25'	150 ft. W 80° 30'	708 ft. E 80° 30'	4300 ft. W 80° 20'	3500 ft. E 80° 30'			
DATE COMPLETED	5-7-63	10-6-63	2-27-63	4-18-63	5-23-63	11-7-63	6-20-63	8-29-63	1-20-63	3-26-63			
ELEVATION	911 DF	903 DF	848 DF	870 DF	939 DF	868 DF	963 DF	962 DF	1028 RT	959 DF			
TULLY					1743-								
ONONOAGA	1881-	1841-	1797-	1879-	1904-	1903-	1930-		2084-	1933-			
ORISKANY	2150- SW	2120- SW	2093-99	2134- SSG	2191-2200	2153- SW & SG	2226- SW	2201-	2352 (hor.) SW & SG	2231-38 SW			
HELDERBERG													
BASS ISLAND			2099-										
SALINA			2174-	2252-	2280-				2352-	2238-			
GUELPH-LOCKPORT	SG & BW @ 2892	BW @ 2896	2678-	2779- BW @ 2950	2783- BW @ 2950	BW @ 2943	BW @ 2960	2840- BW @ 2960	2950- BW @ 3124	2818- BW @ 2985			
CLINTON			2930-	3082-	3053- 3123-3136	3113-3130	3156-	3161-3175	3224- 3290-3301	3084- 3150-3164			
MEADINA (GRIMSBY)	3139 Gas @ 3171-77	3104-3109	2996-3008	3030- Gas	3157- Gas	3148- SG	3183- Gas @ 3251-60	3199- Gas	3322- Gas	3182- Gas			
WHITE MEADINA (WHIRLPOOL)			3030- SG @ 3117-39										
QUEENSTON					3320-		3359-			3353-			
TOTAL DEPTH	3238	3232	3229	3249	3336	3293	3401	3297	3500-	3356-			
DEEPEST FORMATION REACHED	Medina	Medina	Queenston	Medina	Queenston	Medina	Queenston	Medina	Queenston	Queenston			
RESULT	4700 Mcf gas AF RP 1060 psi 72 hrs	3500 Mcf gas AF RP 960 psi 12 hrs	Abandoned	117 Mcf gas AF RP 1050 psi	1167 Mcf gas AF RP 1012 psi 44 hrs	25 Mcf gas from Medina AF Abandoned	6500 Mcf gas AF RP 1060 psi 12 hrs	11,000 Mcf gas AF RP 1015 psi 5 days	800 Mcf gas AF RP 985 psi 41 hrs	15,000 Mcf gas AF			



Table 9. Deep well records, continued.

COUNTY	Erie	Erie	Erie	Fayette	Fayette	Fayette	Greene	Indiana	Indiana	Indiana
MAP NUMBER	61	62	63	64	65	66	67	68	69	70
NAME OF WELL	M. Srenson	G. Shiley	Youghan	Grimes	G. W. Detwiler	Pa. Gamelands Tr 51 A, No. 1	Laura K. Allison (Arthur S. Ingham)	Appalachian Coal Co. #1	Anna Barish	H. M. Bennett
OPERATOR	Worldwide Pet. and Britton	Worldwide Pet. Co.	Worldwide Petroleum Co.	Sun Oil Co.	Peoples Nat. Gas Co. Snee & Eberly	Peoples Nat. Gas Co. Snee & Eberly	John T. Galey	Lee E. Winter	H. S. McKay	ML & H Co.
TOWNSHIP	Conneaut	Conneaut	Conneaut	Wharton	Springfield	Bunbar	Franklin	White	Brush Valley	Brush Valley
QUADRANGLE	Girard D 95	Girard D 102	Girard D 99	Bruceston C 8	Donegal G 31	Uniontown C 39	Waynesburg E 3	Indiana H 20	Indiana H 23	Indiana H 14
LATITUDE	11,900 ft. S 41° 55'	10,450 ft. S 41° 55'	15,200 ft. S 41° 55'	8900 ft. S 39° 45'	8700 ft. N 40° 00'	18,000 ft. S 40° 00'	15,900 ft. S 39° 55'	3800 ft. S 40° 35'	8900 ft. S 40° 35'	14,300 ft. S 40° 35'
LONGITUDE	8000 ft. E 80° 30'	11,950 ft. W 80° 25'	8300 ft. W 80° 25'	13,000 ft. W 79° 30'	11,500 ft. W 75° 25'	7900 ft. W 79° 30'	1900 ft. E 80° 15'	6600 ft. W 79° 05'	8000 ft. W 79° 05'	9800 ft. W 79° 05'
DATE COMPLETED	4-1-63	8-5-63	5-22-63	8-8-63	11-22-63	4-8-63	1-12-63	4-25-63	6-10-63	3-29-63
ELEVATION	943 DF	942 DF	950 DF	2137 KB	1918 KB	1869 KB	1115 KB	1194 RT	1450 DF	1630 KB
TULLY	1748-1753		1780-	7426-7442	7117-	6647-6737	7550-	6715-	6762-	6901-6913
ONONDAGA	1908-	1891-	1962-	8018- Gas	7697- SG	7230- SG	7938- SG	7350- SG	7390- Gas	7552- Gas
ORISKANY	2200 (hor.) SW	2167-	2240- SW	8204- Gas	7859- SG & SW	7398- SG	8207- SG	7492- SG	7529- Gas	7699- Gas
HELDERBERG						7700-				
BASS ISLAND	2200-		2316-			Coeymans				
SALINA	2278-					7829- TonoLoway				
GUELPH-LOCKPORT	2790- BW @ 2952	8W @ 2939	2840- BW @ 3002			8003-				
CLINTON	3060-	3127-3141	3199-							
IRONDEQUOIT		3114-3122								
RED MEDINA (GRIMSBY)	3160-	Gas @ 3210-31	3236- Gas @ 3288							
WHITE MEDINA (WHIRLPOOL)										
QUEENSTON										
TOTAL DEPTH	3274	3257	3322	8378	8090	8032	8323	7505	7541	7723
DEEPEST FORMATION REACHED	Medina	Medina	Medina	Shriver	Shriver	TonoLoway	Oriskany	Oriskany	Oriskany	Oriskany
RESULT	8250 Mcf gas AF RP 1045 psi 14 hrs	5700 Mcf gas AF RP 1100 psi	2400 Mcf gas AF RP 1100 psi	700 Mcf gas AF RP 3375 psi 24 hrs Discovered Well File Field	Not Plugged Suspended	268 Mcf gas 65W AF (Onon-Orisk) RP 2890 psi 30 days Abandoned	100 Mcf gas AF (Onon-chert) PB to 4192 to frac Bradford sd. 300 Mcf gas AF RP 1215 psi	54 Mcf gas and much SW AF Abandoned	2250 Mcf gas AF RP 3425 psi 91 hrs	6900 Mcf gas AF RP 3808 psi 120 hrs

Table 9. Deep well records, continued.

COUNTY	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana
MAP NUMBER	71	72	73	74	75	76	77	78	79	80			
NAME OF WELL	A. B. Crichton	Thos. Donnelly	General Coal Co. 4	General Coal Co. 5	Annie Hadden	Lindsey Coal Co.	Lindsey Coal Co.	W. O. Moorhead	G. C. Murphy	Patton Helrs			
OPERATOR	M. L. & H. Co.	T. W. Phillips Gas & Oil Co.	T. W. Phillips Gas & Oil Co.	T. W. Phillips Gas & Oil Co.	Fairman Drilling Co.	Fairman Drilling Co.	Fairman Drilling Co.	H. L. & H. Co. No. 4477	Fairman Drilling Co.	Fairman Drilling Co.			
TOWNSHIP	Brush Valley	White	Brush Valley	Brush Valley	Cherryhill	Center	Center	Brush Valley	Brush Valley	Cherryhill			
QUADRANGLE	Indiana H 12	Indiana E 27	Indiana H 15	Indiana H 18	Indiana H 24	Indiana F 21	Indiana H 25	Indiana H 13	Indiana H 19	Indiana E 17			
LATITUDE	10,500 ft. S 40° 35'	4700 ft. N 40° 35'	8250 ft. S 40° 35'	3600 ft. S 40° 35'	10,106 ft. N 40° 35'	2550 ft. N 40° 30'	2400 ft. N 40° 30'	3200 ft. S 40° 35'	11,000 ft. S 40° 35'	6400 ft. N 40° 35'			
LONGITUDE	8300 ft. W 79° 05'	2000 ft. W 79° 05'	9000 ft. W 79° 05'	5500 ft. W 79° 05'	12,600 ft. W 79° 00'	7100 ft. E 79° 10'	15,000 ft. W 79° 05'	4500 ft. W 79° 05'	6250 ft. W 79° 05'	50 ft. W 79° 05'			
DATE COMPLETED	1-9-63	9-8-63	4-14-63	5-15-63	7-11-63	6-17-63	7-28-63	3-6-63	4-21-63	5-20-63			
ELEVATION	1551 KB	1557 RT	1539 OF	1269 OF	1689 OF	1539 OF	1585 RT	11440 KB	1650 OF	1556 KB			
TULLY	6860-6882	7004-7037	7016-7036	6552-6574	7105-	7014-	7007-	6718-6740	6825-	6958-			
ONONDAGA	7548-	7646-	7670-	7184-	7799-	7700-	7688-	7337-	7437-	7584-			
CHERT	7566-	7658	7687	7196-	7812	7711	7703	7353	7455	7601			
ORISKANY	7680-	7782-	7812-	7315	7932-	7828-	7828-	7469-	7571-	7717-			
HELDERBERG	Gas	Gas	Gas & SW	Gas & SW	Gas	Gas	Gas	Gas	SG	Gas			
SALINA													
GUELPH-LDCKPDR													
MEDINA													
RED MEDINA (GRIMSBY)													
WHITE MEDINA (WHIRLPOOL)													
QUEENSTON													
TOTAL DEPTH	7696	7788	7847	7323	7951	7873	7842	7491	7593	7730			
DEEPEST FORMATION REACHED	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany			
RESULT	7710 Mcf gas AF RP 4033 psi 72 hrs Discovery Well Crichton Pool	1118 Mcf gas AF RP 3530 psi 48 hrs	3187 Mcf gas AF and much SW RP 3580 psi 22 hrs Abandoned	2381 Mcf gas AF and much SW RP 3440 psi 63 hrs	1175 Mcf gas AF RP 4195 psi 95 hrs Discovery Well Hadden Pool	1700 Mcf gas AF RP 4040 psi 69 hrs	1380 Mcf gas AF RP 4075 psi 51 hrs	2420 Mcf gas AF RP 4040 psi 72 hrs	189 Mcf gas AF RP 2175 psi 92 hrs	2000 Mcf gas AF RP 4078 psi 45 hrs			

COUNTY	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Jefferson	McKean	Mercer	Mercer	Mercer
MAP NUMBER	81	82	83	84	85	86	87	88	89	90	
NAME OF WELL	R & P Coal Co. Flickinger Tract	J. D. Snyder Hrs 398	Hazel Stake Drilling Co.	H. C. Bonner N-888	J. H. Richardson N-504	Pa. Game Lands Tract 195A, No. 1	Bradford Watershed	J. P. Miller N-872	G. W. Rickert N-872	Cromarti IA	
OPERATOR	H & H Co. No. 4794	The Sylvania Corp 398	S. W. Jack Drilling Co.	WYSG Corp. N-888	WYSG Corp. N-504	NYSNG Corp. N-872	George Kroh	Newman Oil & Gas Co., Inc.	The Peoples Nat Gas Co., No. 4382	Wm Vandenberg	
TOWNSHIP	Centre	Brush Valley	Brush Valley	Banks	Canoe	Gaskill	Foster	Lake	Fairview	Mickory	
QUADRANGLE	Indiana H 22	Indiana H 16	Indiana I 26	Punkusutawney E 39	Punkusutawney D 40	Punkusutawney B 38	Bradford A 7	Stonaboro E 6	Stonaboro D 7	Youngstown C 5	
LATITUDE	19,600 ft. S 40° 35'	7950 ft. S 40° 35'	3900 ft. S 40° 35'	9850 ft. S 40° 55'	4100 ft. N 40° 50'	10,400 ft. N 40° 55'	2250 ft. S 42° 00'	3800 ft. N 41° 20'	3500 ft. N 41° 20'	17,500 ft. S 41° 15'	
LONGITUDE	10,800 ft. W 79° 05'	5700 ft. W 79° 05'	800 ft. E 79° 05'	8600 ft. E 78° 55'	4000 ft. E 79° 00'	1500 ft. W 78° 50'	7800 ft. E 78° 45'	5700 ft. E 80° 20'	5150 ft. W 80° 10'	4125 ft. W 80° 30'	
DATE COMPLETED	7-15-63	5-2-63	8-1-63	8-21-63	10-21-63	5-2-63	10-26-63	7-20-63	8-21-63	7-24-63	
ELEVATION	1450 KB	1674 KB	1737 DF	1940 KB	1447 KB	1475 KB	2353 DF	1320 DF	1325 KB	903 RT	
TULLY	6735-6745	6880-	7200-	6794-6970	6715-6868	6534-		3700-	3692-3710		
ONONDAGA	LIMESTONE CHERT	7330- 7385- Gas	7871- 7888- Gas	7469- 7484- SG	7328- 7342- SG	7210- 7225- SG	4601-	3875-	3853-		
ORISKANY	7500- Gas	7680- Gas	8008-	7565-7572 SG & SW	7423-7442 SG & SW	7293-7309	4670- SW @ 4681-	4026- SW @ 4028	4000- SW		
HELLERBERG											
SALINA									4163-		
GUELPH-LOCKPORT								4982- SG & SW @ 5103	4954- SG & SW @ 5121		
MEDINA	RED MEDINA (GRIMSBY)							Ironde- 5364- 5430- SG	Ironde- 5330-34 5400- SG	Gas	
WHITE MEDINA (WHIRLPOOL)								5615-			
QUEENSTON								5621-	5590-		
TOTAL DEPTH	7547	7767	8030	7650	7452	7350	4683	5630	5690	5044	
OREPEST FORMATION REACHED	Oriskany	Oriskany	Oriskany	Helderberg	Helderberg	Helderberg	Oriskany	Queenston	Queenston	Queenston	
RESULT	536 Mcf gas AF RP 4125 psi 257 hrs	2800 Mcf gas AF RP 3480 psi 24 hrs	No shows in Onon- Orisk. PB to Bradford, 500 Mcf AF RP 1050 psi; 15hrs	20 Mcf gas and SW AF Abandoned	SG & SW in Oriskany AF PB to 3225 PB to 3150 (Bradford) 746 Mcf gas AF	Orv In Oriskany 1719 Mcf gas AF RP 1230 psi 20 days	Abandoned	Abandoned	SG & SW AF (Lockport) SG & SW AF (Grimsby) Abandoned	300 Mcf gas AF RP 1455 psi 7 days Shut in	

Table 9. Deep well records, continued.

COUNTY	Northumberland	Potter	Somerset	Tioga	Tioga	Westmoreland	Westmoreland	Westmoreland	Westmoreland	Westmoreland
MAP NUMBER	91	92	93	94	95	96	97	98	99	100
NAME OF WELL	Epler	Pa Warrant 4763	Nellie R Howry	J. L. Trimmer	J. L. Trimmer	Chas. L. Gridley	F. H. Sloan	John R. Cline	Mathew Dale	E. A. Devers
OPERATOR	Matthews et al	Fairman Drilling Co.	Peoples Nat Gas Co and Snee & Eberly	NYSNG Corp. N-505-S	NYSNG Corp. N-911-S	NYSNG Corp. N-906-S	Fox & Sloan	T. W. Phillips Gas & Oil Co.	The Peoples Nat. Gas Co. No. 4376	T. W. Phillips Gas & Oil Co.
TOWNSHIP	Point	Wharton	Allegheny	Clymer	Westfield	Westfield	Franklin	Derry	Derry	Derry
QUADRANGLE	Shamokin A 3	Conrad O 36	Berlin C 1	Elkland D 39	Elkland O 38	Gaines F 107	Greensburg A 3	Latrobe F 17	Latrobe F 13	Latrobe C 14
LATITUDE	6100 ft. N 40° 55'	6300 ft. N 41° 35'	3450 ft. N 39° 55'	13,400 ft. S 41° 55'	11,600 ft. S 41° 55'	12,200 ft. S 41° 55'	15,700 ft. S 40° 30'	7100 ft. S 40° 25'	4500 ft. S 40° 25'	2800 ft. N 40° 25'
LONGITUDE	10,200 ft. E 76° 45'	10,600 ft. W 77° 55'	7820 ft. W 78° 45'	3400 ft. E 77° 30'	1300 ft. E 77° 30'	4550 ft. W 77° 30'	200 ft. W 79° 40'	3300 ft. E 79° 20'	3800 ft. E 79° 20'	8700 ft. E 79° 20'
DATE COMPLETED	8-9-63	12-24-63	8-21-63	9-21-63	11-8-63	10-24-63	10-22-63	3-27-63	1-11-63	2-18-63
ELEVATION	483 OF	2307 KB	1963 OF	1791 G	1612 G	1743 G	1019 RT	1309 DF	1254 KB	1089 RT
TULLY		6306-6366	2495-	3721-	3549-	3828-	6692-6828	7556-	7110-7128	7026-7042
ONONOAGA	Ls: 1350- Sg @ 1400	6994-	Ls. 3488-		4333-	4611-	7185- Gas	8149- 8168-	7656- 7677- Gas	7593- 7607- Gas
ORISKANY	Shriver: 1670-	7021-7059	Ridgeley: 3580- Gas (3583-91) Shriver: 3645-		4345-4367	4615-4637	7373 Gas	8312-	7810- Gas	7730- Gas
HELLERBERG	Stormville: 1954- Sg @ 2073 Keyser: 2104-	7059-	Coeymans: 3850-							
SALINA	Tonoloway: 2338- Wills Creek: 3528-		Tonoloway: 4160- Faults @: 53 70561 0 Wills Creek: 6630-							
GUELPH-LOCKPORT	Bloomburg: 4360-		McKenzie: 7350- Clinton: 8180-							
MEDINA	RED MEDINA (GRIMSBY)		Tuscarora(?) :9005							
WHITE MEDINA (WHIRLPOOL)			SW							
QUEENSTON										
TOTAL DEPTH	4888	7081	9275	4663	4376	4688	7418	8383	7900	7763
DEEPEST FORMATION REACHED	Bloomburg	Helderberg	Tuscarora	Did not reach Onondaga	Oriskany (?)	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT	Abandoned	Dry Abandoned	4150 Mcf gas & SW AF (Orisk.) 1275H/24 hrs. Discovery Well Mt. Zion Field	Drilled for storage Dry	Oriskany Drilled for gas storage	Oriskany Drilled for gas storage	2000 Mcf gas AF RP 3846 psi; 21 days Discovery Well Sloan Pool	Dry Abandoned RP 4332 psi 9 days	6000 Mcf gas AF RP 4332 psi 9 days	2932 Mcf gas AF RP 4000 psi 41 hrs



Table 9. Deep well records, continued.

COUNTY	Westmoreland	Westmoreland	Westmoreland	Westmoreland	Westmoreland	Westmoreland	Westmoreland	Westmoreland	Westmoreland	Westmoreland
MAP NUMBER	101	102	103	104	105	106	107	108	109	
NAME OF WELL	J. W. Jellison	Frank Litvik	Garvin K. Piper	Leroy Piper	Roskovsky	Lloyd P. Stilt	R. E. White	Booth & Flinn	J. Beck	
OPERATOR	Devonian Gas & Oil Co.	Devonian Gas & Oil Co.	T. W. Phillips Gas & Oil Co.	T. W. Phillips Gas & Oil Co.	The Peoples Nat Gas Co.	T. W. Phillips Gas & Oil Co.	The Peoples Nat. Gas Co. No. 4388	Devonian Gas & Oil Co.	Peoples Nat Gas Snee & Eberly	
TOWNSHIP	Derry	Derry	Derry	Derry	Unity	Derry	Derry	Derry	Ligonier	
QUADRANGLE	Latrobe E 22	Latrobe F 16	Latrobe C 18	Latrobe F 15	Latrobe D 20	Latrobe C 21	Latrobe C 19	New Florence D 15	Somerset B 27	
LATITUDE	5500 ft. S 40° 25'	2200 ft. S 40° 25'	3100 ft. N 40° 25'	400 ft. S 40° 25'	1800 ft. N 40° 20'	5800 ft. N 40° 25'	5500 ft. N 40° 25'	5650 ft. S 40° 25'	14,250 ft. S 40° 15'	
LONGITUDE	650 ft. W 79° 20'	3300 ft. E 79° 20'	7000 ft. E 79° 20'	8900 ft. E 79° 20'	3700 ft. E 79° 20'	8000 ft. E 79° 20'	8700 ft. E 79° 20'	10,500 ft. W 79° 10'	8300 ft. W 79° 05'	
DATE COMPLETED	9-4-63	3-27-63	5-29-63	1-22-63	7-31-63	8-13-63	7-4-63	12-13-63	12-8-63	
ELEVATION	1305 KB	1300 KB	1156 OF	1144 DF	1270 KB	1110 OF	1080 KB	1995 KB	2858 KB	
TULLY	7765-7284	7174-7193	7040-	6948-6969	6970-	6970-	6920-6933	6604-6616		
ONONDAGA	LIMESTONE	7832-	7618-	7492-	7505-	7505-	7473-	7268-		
	CHERT	7853-	7642-	7511-	7530-	7530-	7488-	7288-		
ORISKANY	7990- Gas	7900 Gas	7768- Gas	7663- Gas	7650- Gas	7650- Gas	7622- Gas	7410- SG		
HELLERBERG										
SALINA										
GUELPH-LOCKPORT										
MEDINA	REC MEDINA (GRINSBY)									
	WHITE MEDINA (WHIRLPOOL)									
QUEENSTON										
TOTAL DEPTH	8020	7925	7780	7734	7740	7797	7701	7440	7090	
DEEPEST FORMATION REACHED	Oriskany	Oriskany	Oriskany	Harrell	Oriskany	Oriskany	Oriskany	Oriskany	Brallier	
RESULT	1250 Mcf gas AF RP 3709 psi 7 days	4250 Mcf gas AF RP 4200 psi/72 hrs	829 Mcf gas AF RP 3900 psi 21 hrs	P8 to 3300 68 Mcf gas AF (Bradford etc) RP 1180 psi 48 hrs Plug- & Aband Old not reach Tully	4500 Mcf gas AF RP 4264 psi 9 days	789 Mcf gas AF RP 4000 psi 43 hrs	5,500 Mcf gas AF RP 4254 psi 25 days	Est. 200 Mcf gas AF RP 3000 psi 7 days	Did not reach Tully; faulted	



TABLE 10. *Deep well samples collected during 1963*  
(Supplement to Information Circular No. 16 and Progress  
Reports 157, 158, 160, and 165)

<i>COUNTY</i> <i>Quadrangle</i> <i>&amp; No.</i>	<i>Operator</i>	<i>Farm Name</i>	<i>Total</i> <i>Depth</i>	<i>Year</i> <i>Compl.</i>	<i>Sampled</i> <i>Interval</i>	<i>Deepest</i> <i>Formation</i> <i>Sampled</i>
BEDFORD						
Hyndman 1	Kerr-McGee Oil Ind.	M. Martin #1	6676	63	60-6676	Beekmantown
CAMBRIA						
Johnstown 2	Peoples N. G.	Clearfield Bit. Coal Co.	8950	63	20-8950	Oriskany
CARBON						
Mauch Chunk 1	Pure Oil Co.	Harry Smith #1	3211	62	0-3211	Hamilton
CLEARFIELD						
Houtzdale 5	NYSNG #880	P. Swistock #1	8035	63	6900-8035	Helderberg
ERIE						
Girard 59	Pa. Gas Co. #1597	E. C. Miller #1	3460	61	2038-3471	Medina
Girard 62	Britton et al	R. Barker #1	3197	62	1855-3174	Medina
Girard 68	Pa. Gas Co. #1599	H. Adams #1	3612	62	2204-3610	Queenston
Girard 70	Britton et al	McCreedy #1	3230	62	1880-3241	Medina
Girard 75	Pa. Gas Co. #1600	R. Hemstreet #1	3238	62	1791-3230	Medina
Girard 92	Britton et al	B. Blood #1	3144	63	1755-3127	Medina
Girard 95	Worldwide & Britton	M. Serenson #1	3274	63	40-3270	Medina
FAYETTE						
Donegal 31	Peoples, Snee & Eberly	G. W. Detwiler #1	8090	63	50-8090	Shriver
Uniontown 39	Peoples, Snee & Eberly	Pa. Game Lds. Tract 51-A #1	8032	63	30-8000	Keyser
GREENE						
Waynesburg 3	J T Galey	L. K. Allison #1 (A. S. Inghram)	8323	63	50-8300	Oriskany

<b>INDIANA</b>						
Indiana 17	Felmont Oil #160	Patton Heirs #1	7730	63	0-7730	Oriskany
Indiana 21	Fairman Drlg.	Lindsey Coal Co. #1	7873	63	420-7721	Onondaga
Indiana 22	M. L. & H. Co. #4794	R & P Coal Co. #1	7547	63	(5400-5500) (6510-7385)	Onondaga
<b>JUNIATA</b>						
East Waterford 2	Don Waggoner	Wm. Rambler #1	5205	58	2753-4200	Silurian
<b>LYCOMING</b>						
Renovo East 15	NYSNG Corp. #N-836	Pa. Tract 101 #1	7899	62	80-7906	Helderberg
<b>MERCER</b>						
Stoneboro 7	Peoples N. G. #4382	G. W. Rickert #1	5690	63	0-5690	Queenston
Youngstown 5	Atlas Oil & Gas	Cromarti #2	5044	63	0-5049	Queenston
<b>SOMERSET</b>						
Berlin 1	Peoples, Snce & Eberly	N. R. Mowry #1	9275	63	110-9275	Tuscarora
Somerset 25	Peoples N. G. Co.	V. Bearer #1	8815	62	580-7420	Upper Devonian
<b>WESTMORELAND</b>						
Greensburg 3	Fox & Sloan	F. M. Sloan #1	7418	63	40-7397	Oriskany
Latrobe 12	Peoples N. G. #4365	J. Kahl #1	7739	62	50-7730	Oriskany
Latrobe 13	Peoples N. G. #4376	M. Dale #1	7900	63	40-7900	Oriskany
Latrobe 16	Devonian G. & O.	F. Litvik #1	7925	63	7000-7900	Oriskany
Latrobe 20	Peoples N. G.	Roskovensky #1	7740	63	60-7740	Oriskany
New Florence 19	Devonian G. & O.	Booth & Flinn #1	7440	63	160-7440	Oriskany
Somerset 18	Felmont #93	Pa. Tract 42 #2	7955	60	1300-7955	Helderberg

#167, on  
point at sea